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The Magazine for Information Executives

INFORMATION SECURITY & PRIVACY

SEE YOU IN COURT

**Brace Yourself for a
Flood of Lawsuits over
Information Security Lapses** Page 62

PLUS

**Harvard Legal Expert
Arthur Miller on
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**DESIGN A FLEXIBLE
SUPPLY CHAIN****Tales and Tips
From the
Front Lines**

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**I.T. OUTSOURCING
There's a New
Service Model
In Town**

Page 78

Arthur Miller,
who hauled CVS
into court over
privacy violations,
reveals how your
company can avoid
a similar fate.

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Cover Story

INFORMATION SECURITY

See You in Court

Inadequate security leaves companies open not just to hackers but to lawsuits. Here's how to stay out of court and protect your company (Page 62). And in **Miller's Privacy Warning** (Page 72), Legal Expert Arthur Miller says CIOs and corporate America also have to protect people's privacy—or risk a jury's wrath. *By Sarah D. Scalet and Alison Bass*

COVER PHOTO BY MARK WILSON



"I don't mind if people sell their privacy. But what disturbs me is that individuals are not sufficiently informed to make intelligent choices."

—Arthur Miller, Harvard Law School professor

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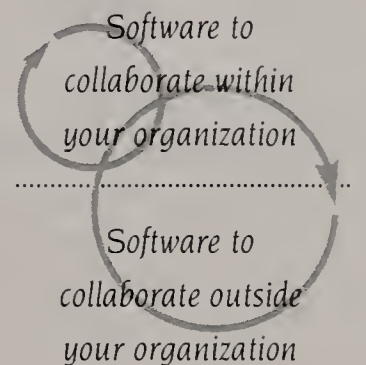
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How Nasdaq Bounced Back

Nasdaq was back up and trading just six days after the World Trade Center disaster. Its CIO, Gregor Bailar, credits distributed systems, contingency planning and a redundant architecture for the exchange's resiliency. Not to mention some very dedicated people. *By Tom Field*

"You have no clue what the next disaster is going to look like. Will it hit a power substation? Will it hit the trains coming in so none of the traders can get in? You really need to be able to communicate and have a place for people to talk about what's going on." —Gregor Bailar



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Why does the technology remain the exclusive domain of large businesses? In light of recent events, it shouldn't be the case. *By Gary Beach*

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FUTURE TENSE: IT AFTER SEPTEMBER 11

This month, in a special section devoted to crisis-related IT developments, coverage includes:

1 A comprehensive look at how the IT community has helped with the recovery effort.

2 Frank Casale, CEO of the Outsourcing Institute, talks about the effect on outsourcing.

3 Readers respond to the Sept. 11 tragedy with sadness, anger, and resolve.

For these features, as well as daily reports, interviews and more, visit www.cio.com/online/crisis.html



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O C E S S I N G

IS CUSTOMER
SATISFACTION ON
A GRAND SCALE.

From the Editor

lundberg@cio.com



For ongoing coverage relating to the attacks and their aftermath, please visit www.cio.com/online/crisis.html.

A Profound Change

AS I WRITE THIS column, it's two weeks and one day after Sept. 11. As I write this sentence, I wonder how long it will be before we all stop looking back to calibrate our lives against that day. A long time, I suspect.

In the past two weeks, we at *CIO* have gone from being stunned to feeling anxious and stressed to getting back into action again. Being from the Boston area, we all feel pretty close to the event. We are now trying to get a handle on how the world has changed and what that means for the way we conduct our business and our lives, just as most of you are, I'm sure. As one CIO wrote to us, "Our country, economy and all our companies will be permanently changed by the events of Sept. 11, 2001. We don't know the final outcome, but we instantly began living in a different world."

Some of the more obvious things that will be affected are security and protection of critical infrastructure, including information systems and networks; business continuity and disaster recovery; international business; how we staff and organize for work; and how we manage our supply chains. We will bring you stories with a CIO perspective on these and other critical topics in the months ahead.

We'll also bring you a series of interviews with

some of the CIOs most directly involved in recovering from the attacks. In this issue, we talk with Gregor Bailar about how he got Nasdaq back online (see "How Nasdaq Bounced Back," Page 54). Soon, we'll also be talking with the CIOs of New York City and the New York chapter of the American Red Cross, who are still in the thick of crisis management, but who would like to share their experiences with other CIOs.

In order to bring these stories to you in the most timely way, we will post them on our website at www.cio.com/online/crisis.html as they are ready rather than waiting for them to come out in print.

Information technology will be an essential part of the solution to our country's recovery and reconstitution efforts. CIOs will be called on to provide leadership on many fronts. Some readers have already shared their early thoughts with us about what that might look like, and we bring them to you here in a special InBox section, following this letter. If you'd like to share your own ideas about what's important now, what you'll be focusing on, how things will be different for your department, your company and business in general, and how this might affect your own decision making and responsibilities, please contact me.

Allie Lundberg

PHOTO BY JASON GROW/SABA

Leaf ant (Colobopsis truncatus)



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Reader Feedback

HOW A CIO CAN HELP FIGHT TERRORISM

In the wake of the terrorist attacks on the World Trade Center and the Pentagon, we invited CIOs to share their thoughts about what had happened, and what it would mean for their companies and IT operations in the months ahead. This first letter was written in the first days after the attack. The notes that follow were written a few weeks later.

THE WORLD DOES NOT SEEM REAL

right now. We watched the horror, and we scan the horizon trying to find an invisible enemy. We donate blood and money and cheer on our armed forces and political leaders, but still, CIOs hang in almost helpless shock, wondering what will come next.

I discovered by accident that I was wallowing in my own sorrow instead of being the leader I should be. It happened when I walked into my programmers' work area to see how everyone was doing. My programmers are probably much like yours. They are Indian and Spanish and Malaysian; they are from New York, Miami and Texas; they are H1-B candidates, new citizens and first- and third-generation Americans. A programmer from Colombia was talking about the WTC attacks. I noticed the wide-eyed stare he was getting from a man from Mexico. Both looked at me with question marks on their faces. "But why" was all they could say.

JOIN THE CONVERSATION

How have your priorities shifted in the aftermath of the events of Sept. 11, 2001? Share your thoughts with other IT execs at www.cio.com/online/crisis.html, or e-mail letters@cio.com.

I explained about forces in the world that not only did not like the American way of life but wanted to see it destroyed. We talked about how these hateful forces were using religion as a cover for their murders. We talked about their fears. I was surprised to hear a young woman from Malaysia say she was afraid to drive home alone. The conversation grew until virtually everyone in MIS was crowded into this area, and I was drawing maps on the white board, explaining the animosities between certain players throughout the Middle and Far East.

I concluded the impromptu meeting and I noticed something as I was leaving. There were no more 1,000-mile stares. Instead there was a sense of normalcy. This MIS department has been plowing ahead ever since.

I learned that I can fight terrorism by fighting terror. My people were shocked. I cannot take credit for having the insight to bring them together and talk it out, but it worked! So I pass the word to other CIOs: If you work to end the terror in just one person, that is one less victory for the terrorists.

Joe Gagliardi
CIO, Unisa of America
Miami, Fla.

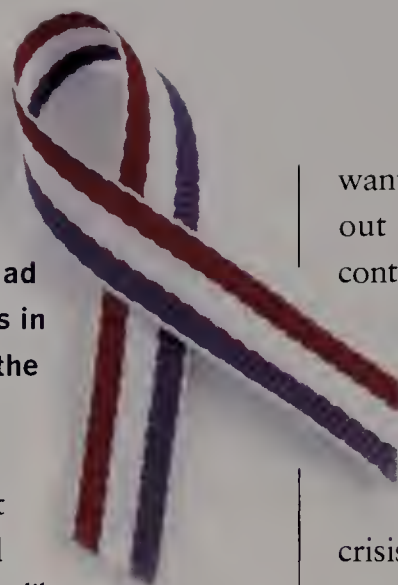
IN THE FACE OF THIS DISASTER, A
lot of us felt helpless. I sure did. We

want to be part of a solution. It turned out there was something we could contribute through IT.

The telecom infrastructure was severely impacted in New York City. We are a big supplier for the companies serving that market, and within 24 hours our crisis team was working on products, processes and services to bring these guys back online. We first asked, "What do we have in inventory and finished goods that we could send?" At the same time, our sales partners were working at ground zero to see what was needed. Our systems gave us a real-time view of what was on the factory floor or sitting on the dock bound for a customer that could be redirected to help get telecommunications restored.

A website was built to host the provisioning status of customers' emergency requests and track them through our supply chain to delivery to the customer. We knew how important it was to restore phone service and connectivity. We had staff willing and able to work around the clock. We in IT were also able to help by donating computing equipment.

For the past few years, we've talked a lot about anytime, anywhere access to information and the ability that kind of access gives you to run your business. In light of these events, that's taken on new meaning. The disaster showed us we could do a better job integrating our tools and information so that we can make split-second decisions. Of course this level of integration has an expense associated with it, but now we will be able to build a better



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business case around the risks and rewards of having that flexibility.

Susan S. Kozik

CIO and VP of Supply Chain & Corporate Centers, Lucent Technologies, Warren, N.J.

A PAINFUL JERK IN PERSPECTIVE.

Victims in the air with the technology to say their good-byes from hijacked airplanes and collapsing buildings, and we on the ground without the technology to save them. All of our work writ on water.

Dragged along by well-choreographed consensus, we've spent a fortune and the past 25 years attempting to wring the mystery and its attendant hazards out of the future by advantage of visibility and the discipline of systems. The economic downturn and the events of Sept. 11 remind us that visibility isn't watching, and every system, no matter how sophisticated, is chaotic at some level. So after a blistering run up of effort and expectation, we'll live for a while with loss, disappointment and tortured reflection that will, no doubt, affect our thinking for the rest of our lives.

In some respects, it's been easy to be a CIO the past 10 or so years. Big projects, with the assistance of the media and fat marketing budgets, have practically sold themselves. And if things didn't work out, which they often didn't, CIO jobs and the next big reengineering gamble were easier to find than a box to put your belongings in. For the next few years, things won't be so easy. For a while, cash won't go looking for projects. We'll stop betting that technology will be used (and used well) if we simply make it available. As we work through this collapse of certainty, only the handful of CIOs worthy of their titles will find a way to push their departments and companies along.

Angels are in the details, and we ought to get about the business of closing the holes and eliminating the blind spots. Too much has been left to chance. The best throw of the dice is to throw them away.

Jerry Gregoire

Retired CIO (Dell, Pepsi), Austin, Texas

IN THE WAKE OF THE TERRORIST attacks on our soil, our focus should be to reassert our lifestyle and the way we treat people, and continue to make people from all backgrounds and beliefs feel comfortable here and encourage companies to stay the course. If we succumb to the people who want to change our lifestyle, they win.

For years it's been difficult for CIOs to set technology policy in the way a CFO makes a ruling on how we handle the cost of capital or the head of HR creates a policy on how we treat people. These things are more or less understood by the CEO and don't have to be intensely negotiated. Now the policies in the CIO realm (availability, access control, restoration) are heightened, and the CIO ought to emerge as an arbiter of how a company positions itself vis-à-vis risk. This should not be negotiable. The CIO should march forward more confidently at the management committee and board level. At the end of the day, the CEO is counting on the CIO to do this, but because the CEO doesn't understand the issues as well, he is less confident about being able to back him up.

In the late '80s and early '90s, we went through a huge effort to consolidate data centers. It was my view that the best solution for Rockwell was to consolidate to two centers that balanced the load and were a mirror image. Because of cost pressures, we ended up closing the mirror center and had all of our eggs in virtually one basket on the West Coast. We were vulnerable to earthquakes and located under an airport flight path. If an attack like this had happened back then, we'd have been asking why on earth we have our only data center located there. We entered into contracts with Sunguard for backup availability in Philadelphia. But given this new reality, I would have argued more vigorously to maintain our Texas center, and I think I would have gotten more support.

James F. Sutter

*Senior Partner, The Peer Consulting Group,
Seal Beach, Calif., (Former VP and GM,
Rockwell Information Systems)*

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SIEBEL.

Good service
is good business.

A person in a dark suit stands in the center of the frame, surrounded by bright, white flames that rise from the bottom and sides. The background is dark, making the flames and the person stand out. The overall mood is dramatic and intense.

SIX DANGEROUS MYTHS

ABOUT e-BUSINESS PLATFORMS.

THE WHOLE e-BUSINESS THING IS A FAD.

Nothing could be further from the truth. In times of economic downturn, it may seem prudent to put the whole e-Business issue on the backburner. But it's not. Tough times call for speed, nimbleness and agility more than ever. The time to get smart and implement e-Business solutions for your customers is today.



THE INTERNET CHANGES EVERYTHING.

The Internet does not change everything. It doesn't change the business rules that run your company. Or the infrastructure you've spent years building. Or the nature of your business. Or your need to generate revenues and profit.

The Internet is obviously a critical part of any e-Business. But the Internet is only a common set of protocols for the transport of information. It's how well you manage that information that determines the success of your business.

IT'S A ONE-BRAND WORLD.

This myth surrounds just about every significant e-Business platform discussion. Virtually every purveyor of e-Business platforms touts their version of this "one-brand" world. Their brand, of course. Big surprise.

At Sybase, we know it's just not true. Countless brands compete,

cooperate and commingle inside your company. It's laughable to pretend that any one external organization can "standardize" all the various protocols, systems, components, new technologies, languages, databases and vendor relationships that your business depends on to succeed.

Our open e-Business platform embraces diversity. Making all of this stuff work together is what our stuff is all about.

A WEBSITE IS A PORTAL. A PORTAL IS AN e-BUSINESS.

Well, not quite. A website is not a portal. And even if it was, a portal is not an e-Business.

Portals and websites along with application servers, databases, customer relationship programs, automated supply chains, an efficiently connected field force and the rest of your back office are all vital components of an e-Business. It's making them work together that's the trick.

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Just something to think about when people offer you buzzwords instead of technologies.

IF AT FIRST YOU DON'T SUCCEED, THROW SOME MORE MONEY AT IT.

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Edited by Sandy Kendall

S T A F F M A N A G E M E N T

Reviews in the Round

By Jeffrey L. Seglin

EVER BEEN ASKED to review your boss? You might want to get ready. A Society for Human Resource Management survey last year found that 32 percent of human resource professionals were using 360-degree feedback for executives at their companies. "Three-sixty" involves reviewing employees from all angles—that is, getting input from bosses, subordinates, peers and even customers. The many perspectives give a more complete sense of a person's effectiveness on the job and can help an organization focus on long-term goals by clarifying how each employee can contribute to the company.

Still, the tool is no panacea for dysfunctional organizations to work their way out of trouble. Giving honest and complete information to a boss about his performance can be tough and requires a high level of trust. If the method is used just to gather dirt on troublesome people whom everyone loathes but no one has the gumption to fire, then the process will be perceived as punitive. "It's something you do in a relatively healthy organization. If it's [being considered] because management lacks the



courage to give straight feedback then don't use it," says Maxine Dalton, a practice area director at the Center for Creative Leadership in Greensboro, N.C.

To ensure that reviewers feel secure enough to give an honest review, protect confidentiality—specific sources should not be identified when presenting results to managers. If the review requires rating on

a numbered scale, use averages. If narrative comments are given, aggregate the highlights. Michelle Collins, a consultant with HR Development in Dallas, advises that reviewers answer questions about their observations, such as a manager's ability to meet deadlines or follow through on

Continued on Page 28

"I LOVE PROGRESS; IT'S CHANGE I HATE."

—Paul Saffo, director of Institute for the Future, quoting Mark Twain at the 2001 CIO-100 Symposium in San Diego

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USER RELATIONS

Blue Monday

A RECENT SURVEY of 86 IT managers conducted by support automation software company Support.com of Redwood City, Calif., revealed that 80 percent of IT staff hates Mondays. While it may be that a large percentage of any staff has some Monday aversion, for IT workers it's more than just readjustment from the weekend. It turns out that on Mondays IS staffers get the highest number of support calls from users regarding PC and application problems. Other support inquiries tend to be spread out over the week, the survey reports. Nonetheless, 6 percent of IT support staff cites "every day" as the worst day for IT queries.

Reviews in the Round

Continued from Page 26

requests. They should think back over the entire year rather than an incident that happened one time.

"The feedback should always be about individual and business performance," says Richard Lepsinger, a partner with Right Consulting in Stamford, Conn. "It's not just that nice warm squishy thing of, 'Wouldn't it be nice to know?'" The goal for the boss who's being reviewed, he says, should be to enhance his performance so all of you can enhance the business's performance. To make this work, it's important to review how the manager's personal goals tie into the company's long-term strategy.

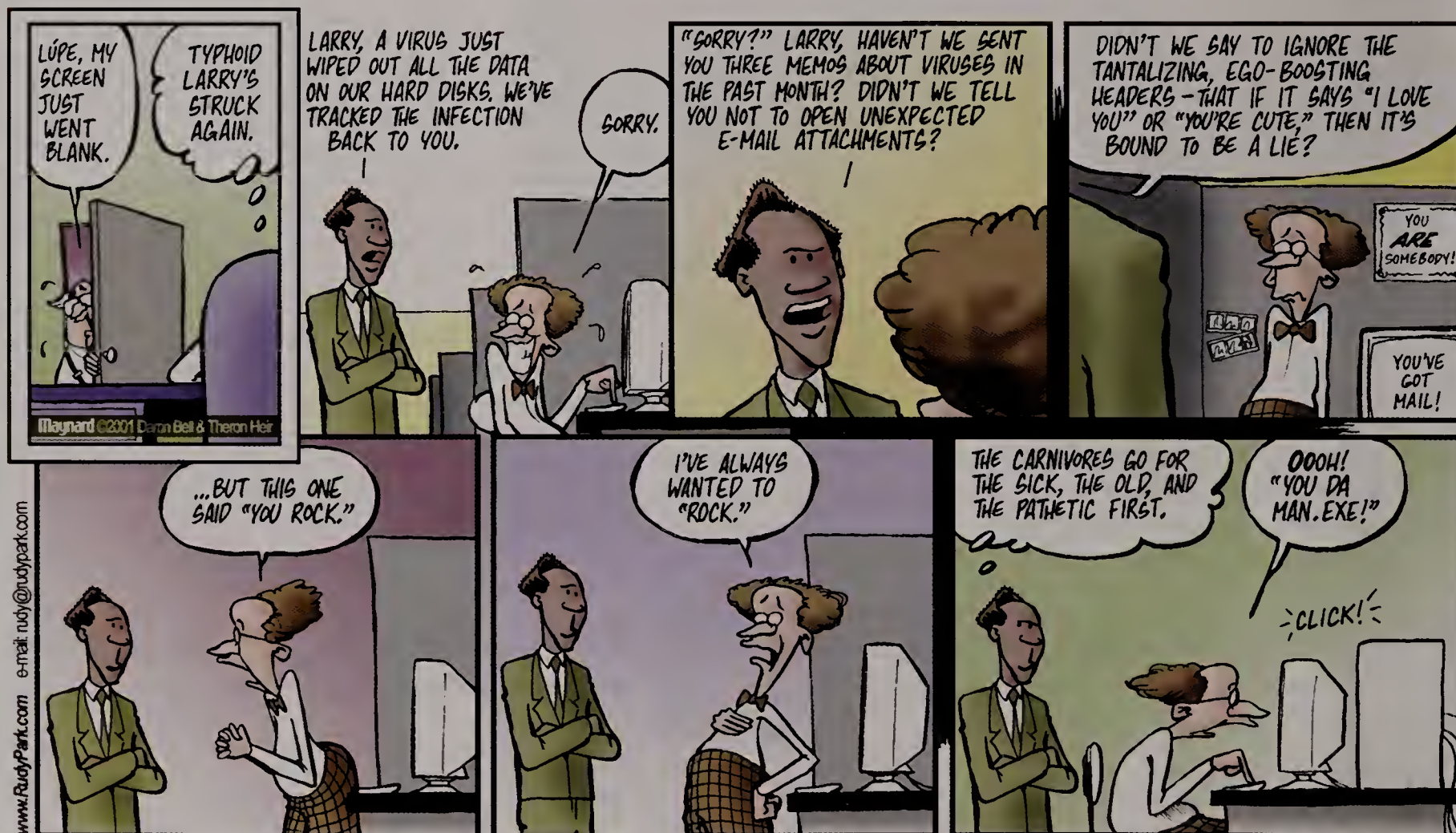
Bosses should acknowledge the re-

ceipt of results. Collins advises managers to get their teams together, thank them for the feedback and tell them what they've learned. According to Dalton, a boss makes herself publicly accountable if she explains what she's working on based on the reviews. "People who do that consistently show improvement on subsequent ratings," she says.

feedback

Responses or ideas for Trendlines?
E-mail Departments Editor Sandy Kendall at skendall@cio.com.

Maynard BY DARRIN BELL AND THERON HEIR



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By the Numbers

By Lorraine Cosgrove Ware

Retain Your Top IT Talent

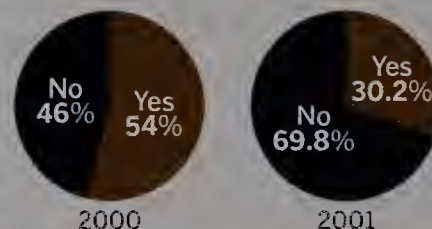
CIO's July 2001 survey of 176 IT professionals shows that while the IT staffing crunch has eased in 2001, some skills remain in short supply and retention is still a big concern. Maria Schafer, program director at Meta Group, suggests that companies develop competencies in human capital management—defined as all the processes that are needed to leverage talent in the organization—to meet staffing and skill management challenges.

CIO RESEARCH

Keep the Staff You Have

This year, your IT staff members are more likely to stay put.

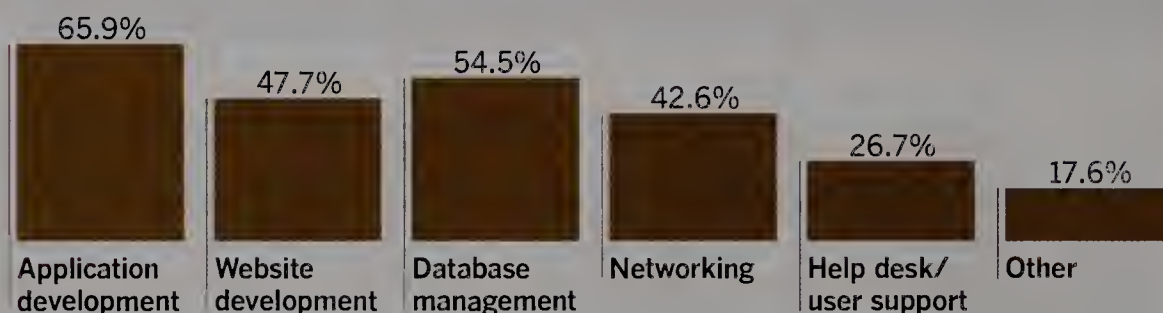
Q: Is your company experiencing difficulty retaining IT staff?



IT Skills Are in Demand

While companies continue the search for skilled IT staff, those staffers with an application development background are most desired.

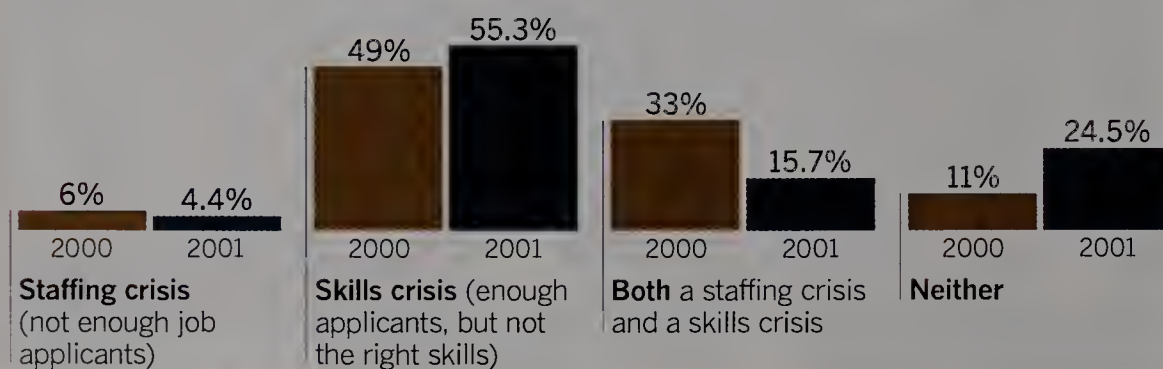
Q: What IT skills are currently most in demand in your organization? (Select top three skills.)



Staff Versus Skilled Staff

There are plenty of applicants for the job, but in 2001 we're still experiencing a skills crisis.

Q: In your opinion, is there an IT staffing crisis or an IT skills crisis?



"In 2001, CIOs are being asked to maintain and expand their services with less resources, which puts greater demands on a department where the burnout factor was already high."

—Maria Schafer, program director at Meta Group's Executive Services

Best Practices

1. Create a structure that derives the most value from your staff. "Most companies don't have a human capital management process; it's more like crisis management," says Schafer. Organizations need a holistic approach that links processes like hiring and recognition, performance reviews, resource management, budgets and skills.

2. The CIO cannot do this all alone. Form a strategic relationship with HR to educate them on what IT requires, and align hiring and business needs. Ideally, a company should have a dedicated HR person who understands IT to develop job descriptions, incentive and retention programs. "CIOs tend to be very focused on technology when increasingly it is not technology alone that makes a good product. It's awareness of the business needs and communication skills," Schafer says.

3. Keeping talent isn't always about money. CIOs don't necessarily need to get more creative in their retention strategies, they need to be more aware of the mood, workload and personal priorities of their staff and have a multiplicity of incentives in place like training and recognition.

Suggest future topics to numbers@cio.com.

SOURCE: CIO IT STAFFING SURVEY, JULY 2001

The Truth About Web Services

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- Web Services and Component Technologies

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P E R F O R M A N C E M E T R I C S

Code for Cash

By Daniel J. Horgan

TOURNAMENT FEVER is on the rise again, but for this particular sport, game play takes place not on the court but rather within the digits of computer code. Competition is driven by the mental agility of the players who, despite their big-league abilities, promise to stick around for their senior year.

At TopCoder.com, a Glastonbury, Conn.-based coding competition company, programmers participate in semiweekly online programming competitions for cash and, if lucky, qualify for the big dance at either of the two major annual tournaments. The TopCoder Collegiate Challenge premiered in June and lent center stage to the younger hotshots. The TopCoder Invitational Tournament, which is open to all members of the growing TopCoder community, will bring together 16 semifinalists (out of 256 qualifiers) on Nov. 2 and 3 at the Foxwoods Resort and Casino in Mashantucket, Conn., to compete for a \$250,000 purse.

At Foxwoods, semifinal competitions will pit four programmers against one another. They must create a code to satisfy an assigned scenario within a 75-minute time limit. Contestants then spend 15 minutes in the challenge phase scanning opponents' codes, highlighting any flaws in an attempt to oust their rivals. Winners of each round advance to the finals in the tournament championship. Jason Woolever, former MIT grad student and reigning Collegiate Challenge champ, banked \$100,000 for his clutch performance last June

in San Francisco. He's now a senior research and development engineer for Synopsys in Sunnyvale, Calif.

Been fantasizing about drafting a superstar such as Woolever onto your IT squad? Companies can either post jobs at www.topcoder.com or take advantage of a match-maker-style hiring program in which TopCoder fetches a qualified programmer from the member community based on a company's demands. Also useful is a complex rating system that distinguishes one coder from another, allowing employers to evaluate and compare potential employees. "TopCoder was put together to differentiate between [programmers]," says Jack Hughes, founder and chairman. "The programming community is not homogeneous."



At TopCoder's Collegiate Challenge last June, the stage was set (center) for the final four programming competitors (bottom) to vie for the cash prize, eventually won by Jason Woolever (top).

"When I was a student at MIT in the AI lab, supposedly we were working on knowledge representation and natural language, but all the students would come in at night when they weren't supposed to and work on all these other things, games and programs.... All the stuff we weren't supposed to be doing turned into important business things; the things we were supposed to be doing are still just academic papers. It's worth tapping in to the troublemakers."

—Danny Hillis, cochairman and chief technology officer of Applied Minds, at the 2001 CIO-100 Symposium in San Diego



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On the Move

Compiled by
Lauren Capotosto

Blockbuster Looks to IT for Box-Office Success

A YEAR AGO, industry analysts predicted that video-on-demand systems would put rental chains out of business. And Hollywood film studios have made their own noise about ushering in the age of direct-to-consumer video-on-demand. To protect its turf, Dallas-based Blockbuster has appointed a new CIO to bolster corporate IT systems and prepare the video rental chain to ride the wave of emerging technologies.

With his 30 years of IT experience, Glenn Thistlethwaite, Blockbuster's new CIO, is determined to help the \$5 billion company remain the country's largest video rental chain. Blockbuster has the technology to deliver video-on-demand and the partnerships to guarantee itself a leading position when that marketplace explodes, Thistle-

thwaite says (although Blockbuster's video-on-demand projects are under the auspices of the company's new media division, not Thistlethwaite's IT organization).

In the meantime, Thistlethwaite is charged with improving the company's services to customers through IT. His immediate plan is to transform the 300-person IT department from a technology-focused group to a business-focused—and customer-focused—department. "We need people to have a business perspective, and you can't do that if all you understand is bits, bytes and networks," Thistlethwaite says. He also plans a radically different approach to implementing business solutions. With few applications available for "rentailers," Blockbuster has designed its own applications since 1985. But

Thistlethwaite will now integrate off-the-shelf applications wherever possible. The less the company needs to customize, the better, he says. Purchasing off-the-shelf applications like warehouse management and labor scheduling apps will save money, and speed the delivery of services to customers.

Thistlethwaite was a consultant for PricewaterhouseCoopers prior to joining Blockbuster. In that role, he advised Blockbuster CFO Larry Zine, who had assumed the IT executive role when the company's previous CIO retired in the spring. Thistlethwaite completed an organizationwide IT assessment for Blockbuster as its IT consultant.

Player's Guide

Minster Joins Yurman Designs as CIO

David A. Minster, former vice president and CIO of the Elizabeth Arden Co., has joined New York City-based Yurman Designs as vice president and CIO of the fine jewelry company. He is responsible for management of all global information systems, including e-business. This is a newly created position at Yurman.

Gelb Named CIO at National Grange Insurance

Joel Gelb, former senior vice president and CIO at Frontier Insurance Group, has joined National Grange Insurance Co. as vice president and CIO of the Keene, N.H., enterprise. He has extensive experience in technology and insurance information systems management.

Other Moves

Tanya Dins has been appointed CIO at Kana, a Menlo Park, Calif.-based vendor of eCRM products.

Merrill E. Feldman was recently named chief enterprise information officer (CEIO) at Ion Systems, a Berkeley, Calif.-based supplier of electrostatics management solutions.

Larry Godec, former CIO of First American Real Estate Tax Service, has been named CIO of First American Title Insurance Co. in Santa Ana, Calif.

Lee-Tyler Mun, former CIO of Realnames, has joined Nuance as vice president and CIO of the Menlo Park, Calif.-based vendor of voice Web software.



Will Smith, former vice president and CIO at WRQ, has joined NetIQ as vice president of worldwide IT for the San Jose, Calif.-based vendor of e-business infrastructure management software.

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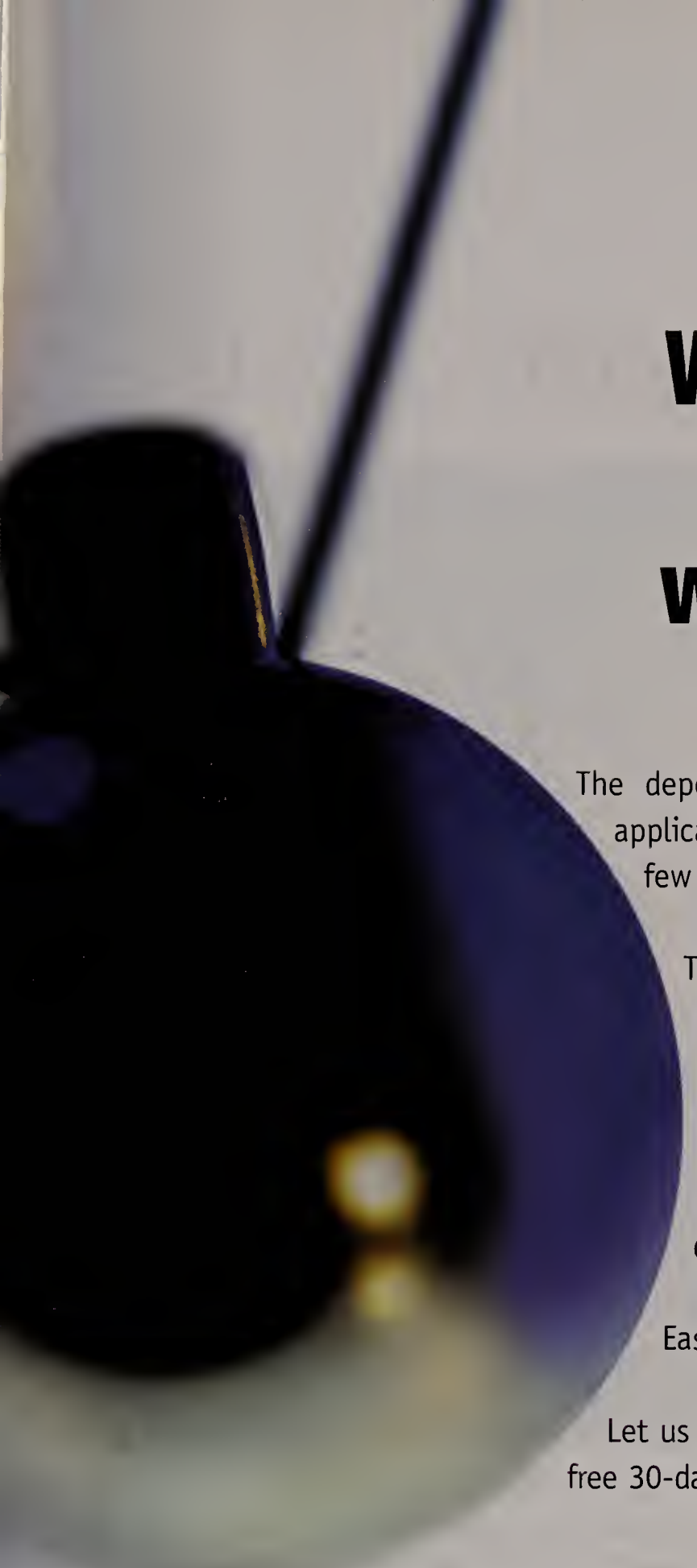


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Look Before You Leap

If you're contemplating taking a new job, first assess the lay of the land

BY CHRISTOPHER HOENIG

WHEN YOU TAKE A NEW CIO JOB or similar executive position, what can you do right off to give yourself the greatest chance of success? That's one of the questions I get asked most frequently.

There's no doubt that the most successful CIOs take the time to assess the lay of the land *before* digging in to a new job. That means working through progressively deeper levels of understanding and commitment as you move from investigation of your choices to contract negotiation to those first months on the job. Here's the best of what I've learned.

Your Starting Point

Before you take any new job, you must understand where you'll be starting. That means getting a good view of all the different elements that can have an impact on you.

Industry and market dynamics. Having experience in an industry or sector doesn't necessarily mean you've taken a step back to analyze the macroeconomic trends (is it mature or developing?), market dynamics (what is the competitive situation?) and structural trends (are there likely to be major technological or regulatory disruptions?). As the past year has



shown, these dynamics can have a huge effect on your success.

The enterprise. Many CIOs neglect to assess the overall business. What is the history and current financial picture? What is in the current investment portfolio, including not just technology projects but also business projects? How mature are the company's business and management processes? Don't forget to ask for any recent independent reports or analyses.

The people. In considering your potential colleagues, assess not only their leadership abilities, style, character, competence and chemistry but also their track record and likelihood of staying. I've heard countless stories of people unhappy with their jobs because they joined the company excited about working with a particular person, only to have him leave soon after. Look key people in the eye and ask them point blank what their plans are.

The job. I believe in not only knowing a position's history but also viewing its description as a rough draft that can be

ILLUSTRATION BY OLEG KOULIKOV

DATA STORAGE IS NO LONGER *THE SILENT PARTNER.*

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fig. 1.1: Storage screaming for your attention (metaphor)

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@ business infrastructure

Total Leadership

edited during a period of negotiation. Think about how the position has changed over time and the people who have had it, as well as those who may want it now. What are the scope, the reporting relationships and the unwritten expectations?

The setting. Take into account everything from your physical

problems and trying unsuccessfully to redefine them.

Success and failure. The next task is to define success or failure specifically enough so that the key players all can agree. Central considerations will be the specificity of your destination, how fast you have to get there, what risks you can take and what resource constraints you'll be operating under.

Strategies and tactics. Aligning goals and defining success won't help you if there isn't a common view of strategies and tactics for which route to take. Many of them may be written in a strategic plan. Few will be effectively

translated into the realities of execution. It will be vital for you to get a sense of the organization's capacity for formulating and executing strategy well.

Blind spots and biases. Probe unmercifully for sacred cows, sludge projects, unwritten rules, cultural dark sides and any other things that might jump out of the closet at you to make your life miserable and your job impossible.

Time. One of the hardest things to get a sense of during interviews is the timing and rhythm of work. What shot clocks are running? Where are the long lead times that haven't been thought about? It's vital to obtain clear expectations from the

Make sure you know how much time—and how often—you'll have to meet with your CEO.

location and travel expectations to your office, support and technology needs. Nothing's too small to get right from the start.

Your Destination

The second aspect of getting the lay of the land involves defining what you're going to be confronting.

Problems and opportunities. In most organizations, there are too many opinions, too few facts and multiple points of view. You'll need to make your own assessment. Then judge the probability of getting collective buy-in on a direction. I've seen companies and good CIOs waste years solving the wrong

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top about any areas where time pressure is significant. I know one executive who found himself in a job with a hidden key project failure that absorbed nearly all of his time for the first year. By then, he had lost credibility as well as all his energy.

Full Steam Ahead

Now how do you get the job done? The devil is in the details, but you won't have the leverage to negotiate them once you've signed a deal. So make sure you get them right beforehand.

Assets. The practical details start with your budget and other key resources. The best advice I've heard is to get a budget bigger than you need, if at all possible; that way you can give some of it away during the early part of your tenure, thereby enhancing your position and relationships with peers.

Control. Clearly understand your authority and accountability: where it is sole and where it is collective. In collective situations, what is your position and degree of power? Also, don't forget to anticipate changes of control and get terms in your contract that give you freedom and protect your assets. Finally, control is just as important in your eventual exit. Anticipate all scenarios and provide for them before you start.

People. If the existing staff isn't up to the issues you'll be

tackling, you'll need to get the time, resources and approval—up front—to bring in a new team.

Access. Make sure you know how much time—and how often—you'll have to meet with your CEO. Identify other leaders you'll need access to and try to get agreements there as well.

Compensation. Finally, make sure you're taken care of in salary, benefits, performance bonuses, equity, severance benefits and other sweeteners. If you've never done so, ask a quality attorney or CIO acquaintance to share some of the best contracts or agreements they've seen.

No matter where you are in your career, the problems you face in a new position will be tough enough, so give yourself the best possible chance of success before you start. **CIO**

How do you assess the lay of the land? Let us know at leadership@cio.com. Christopher Hoenig has been an entrepreneur, government executive, consultant (McKinsey & Co.) and inventor, and is the author of *The Problem Solving Journey: Your Guide to Making Decisions and Getting Results* (Perseus Publishing, 2000). He is now chairman and CEO of Exolve in Washington, D.C., focusing on next-generation Web-based problem solving.



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GLOBAL BUSINESS

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Capital One Bank Europe CIO Catherine Doran contends with continental differences in data usage.

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Charging into Europe

Credit card maestro Capital One has built an independent beachhead in Britain and is planning its channel crossing **BY MALCOLM WHEATLEY**

CAPITAL ONE FINANCIAL OF FALLS CHURCH, Va., has built an entire business on the savvy use of information technology. In the U.S. market, sophisticated software tools—many of them developed in-house—trawl terabytes of demographic data, looking for consumers to target with finely judged offers of credit, each offer complete with customized interest rates, conditions and fees. In contrast to the scattergun approach adopted by most of its competitors, Capital One has long trumpeted what it terms its “information-based strategy” to

credit rating and product development.

Most recently, Capital One’s proprietary data-mining and credit-rating tools have been deployed to identify profitable borrowers, or “super prime” consumers, who are smart enough to see through the introductory teaser rates offered by other credit card issuers bombarding their mailboxes, yet still want a better deal than they were getting from their mainstream card issuer.

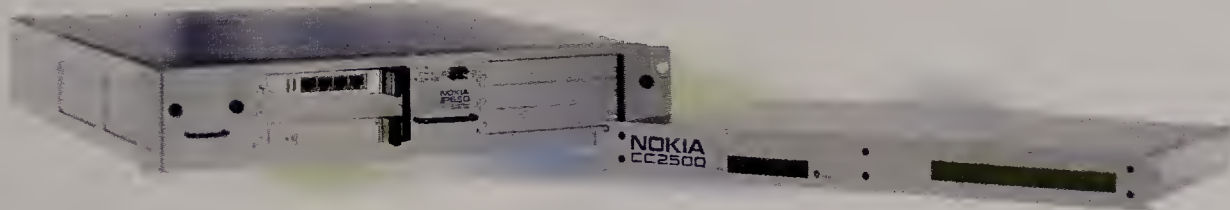
Enter Catherine Doran, CIO of London-based Capital One Bank Europe. Her mission: First, pull

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—Network Computing, May 14, 2001



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off the same locate-and-lure trick with European consumers and then repeat the performance on the global stage. It's a peculiar challenge, she admits. Clearly, the European offshoot can't stray too far from Capital One's highly public commitment to its tried-and-tested information-based strategy without making investors nervous. But how do you go about applying an information-based strategy when, for example, the information you need either doesn't exist or is protected by tough European data privacy laws?

"Cautiously," says Doran, with an Irish lilt that betrays her origin. Capital One took little risk by launching its first global foray in the United Kingdom in 1996. It was the European country closest to the United States in terms of credit card usage, availability of demographic data and good, consistent credit-rating information—with several credit bureaus (France, by contrast, doesn't have any), credit data cross-referenced to the electoral roll (illegal in some countries), and both positive and negative data available (some countries allow only certain categories of data to be stored).

Initially, Doran says, the IT function was outsourced to the Bank of Scotland, a move that both reduced risks and setup costs, while speeding time-to-market.

That was always a short-term measure, though, because Capital One's informa-

tion-based strategy calls for a constant stream of new products to attract customers. "When you must respond quickly to changes in the marketplace and when

you've outsourced that capability, you're at the mercy of other people's prioritization decisions," she says. "We needed to become masters of our own destiny." Backed by the stream of new products tailored to U.K. consumers, Capital One's soft approach to globalization has paid off. The U.K. business currently employs 2,400 people, split between London and an operations center in Nottingham, and boasts more than 2 million customers—not bad from a standing start.

Independent Operations

Doran and her senior subordinates remain in close touch with their counterparts at headquarters—particularly in areas where the American market is more mature. In the e-commerce arena, for example, Doran happily admits to "shamelessly exploiting the learning that the U.S. [operation] has made regarding design and middleware."

Despite this, the U.K. operation is definitely not a clone of what exists in the United States. "It's easier to list the overlaps with the U.S. than the differences, because it is a completely independent infrastructure," she says. "We certainly didn't take code from the U.S., stick it on a tape and implement it in Nottingham."

In part, the variations are attributable to the different financial and legislative environments. The detection of fraud, for

The European offshoot can't stray too far from Capital One's highly public commitment to its tried-and-tested information-based strategy without making investors nervous.

example, is fundamentally different in the United States, and consequently a wholly new approach had to be taken for the United Kingdom.

Even in noncore areas of the U.K. venture, systems have been built from the ground up, rather than on U.S. foundations. Vendors, too, are not always standard between the countries. "Obviously, there will be areas where we use the same vendors, but it's not a deciding factor in the selection decision," Doran states.

AT A GLANCE

Capital One Bank Europe

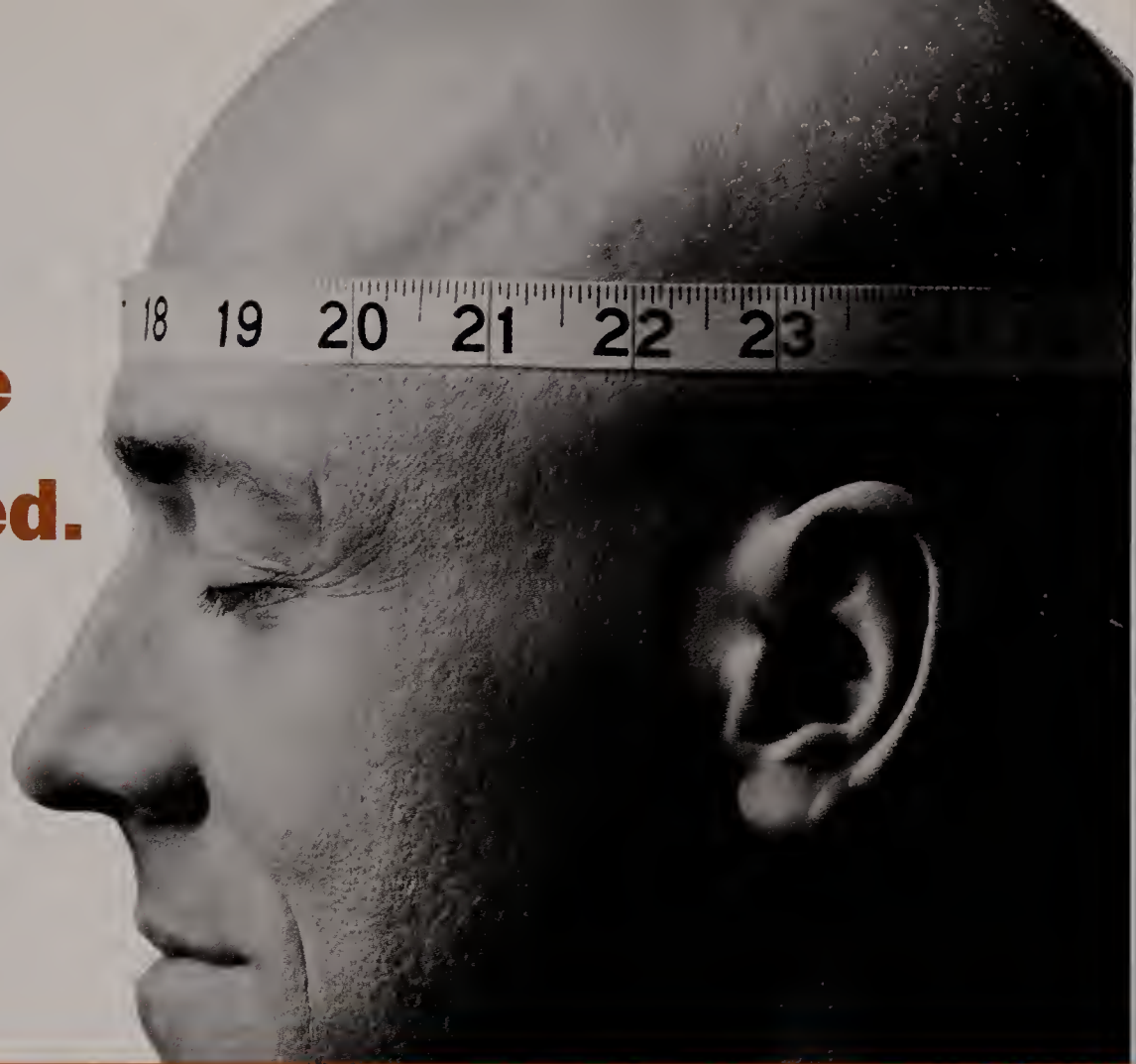
The Business: Spun off from Signet Bank in 1995, Capital One Bank has since become one of the top 10 bank card issuers in the United States and United Kingdom by applying smart IT to the task of figuring out whom to lend—and not lend—credit.

The Challenge: Moving from a well-understood American market to countries where the very notion of credit cards is alien and the data the business needs to run does not exist.

The Solution: A combination of cautious, step-by-step rollouts—using surprising amounts of custom software—and a willingness to think through the practicalities of operating in foreign countries.

While conceding that commonality remains a long-term goal, Doran points to several reasons why aspiration thus far falls short of reality—support, for example. "Some of the [American] solutions have no support basis in Europe, and where they underpin business-critical processes, it's unacceptable to wait several hours for an initial response," she says. Cost is another factor. "Many of the applications have

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been heavily customized for the U.S. market—in respect of currency, ZIP codes and so on—making them inappropriate for the U.K. market and often not economical to transform.”

Channel Crossing

Once the U.K. operation was bedded and delivering, it was time for Doran to cast her eyes further afield. Following trials in France, Capital One recently launched operations there. Another couple of European countries should go live during 2002, she adds, with a further two or three going the following year. “As we’ve looked at Europe, we haven’t seen a single formula for how we should go into a country—it’s not a canteen menu but more of an *à la carte* approach,” she says.

It’s clear that Doran anticipates the European rollout with relish. That was the challenge that lured her from a top IT post

with Natwest Bank, one of the United Kingdom’s banking giants. There, she had 1,500 employees and a budget of 110 million pounds—whereas at Capital One, it is just 300 staffers and a budget that,

ticalities of entering new national markets. Language complexity is a key consideration when it comes to call center location, for example. “Do you have one call center which covers all of mainland Europe? It

“As we’ve looked at Europe, we haven’t seen a single formula for how we should go into a country—it’s not a canteen menu but more of an *à la carte* approach.”

—CATHERINE DORAN, CIO, CAPITAL ONE BANK EUROPE

although undisclosed, is likely to be on a similarly reduced scale. “The [Natwest] numbers were huge,” she says. “But the numbers for me were never the attraction: Instead, it was the excitement, the challenge and that butterflies in the tummy feeling as you did something new.”

Another difference was the frustration stemming from the very nature of British retail banking. At Natwest, “we were taking processes that had evolved over 300 years and were attempting to apply modern technology to move things forward,” she says. “Here, there’s much more of a blank sheet of paper.”

A mixed blessing, perhaps. Not all continental Europeans have taken to credit cards to the extent that British and American consumers have—although they still borrow money. In Germany, auto loans are big business, while French consumers increasingly charge *le shopping* to store cards. Doran robustly rejects these facts as inauspicious. She characterizes the market as one of latent demand rather than no demand. “You might say there’s no demand—but look at the take-up of mobile telephones, which we all now can’t live without.”

While the marketing folks tailor their pitches, Doran is wrestling with the IT prac-

might make sense from a business perspective, but if you do have one center, you’ve got to have fluent Dutch, German, French and Italian speakers in sufficient numbers and located in the same place—which is an interesting challenge,” she says. The final decision? Geographically dispersed call centers, rather than a single one.

Countries of Origin

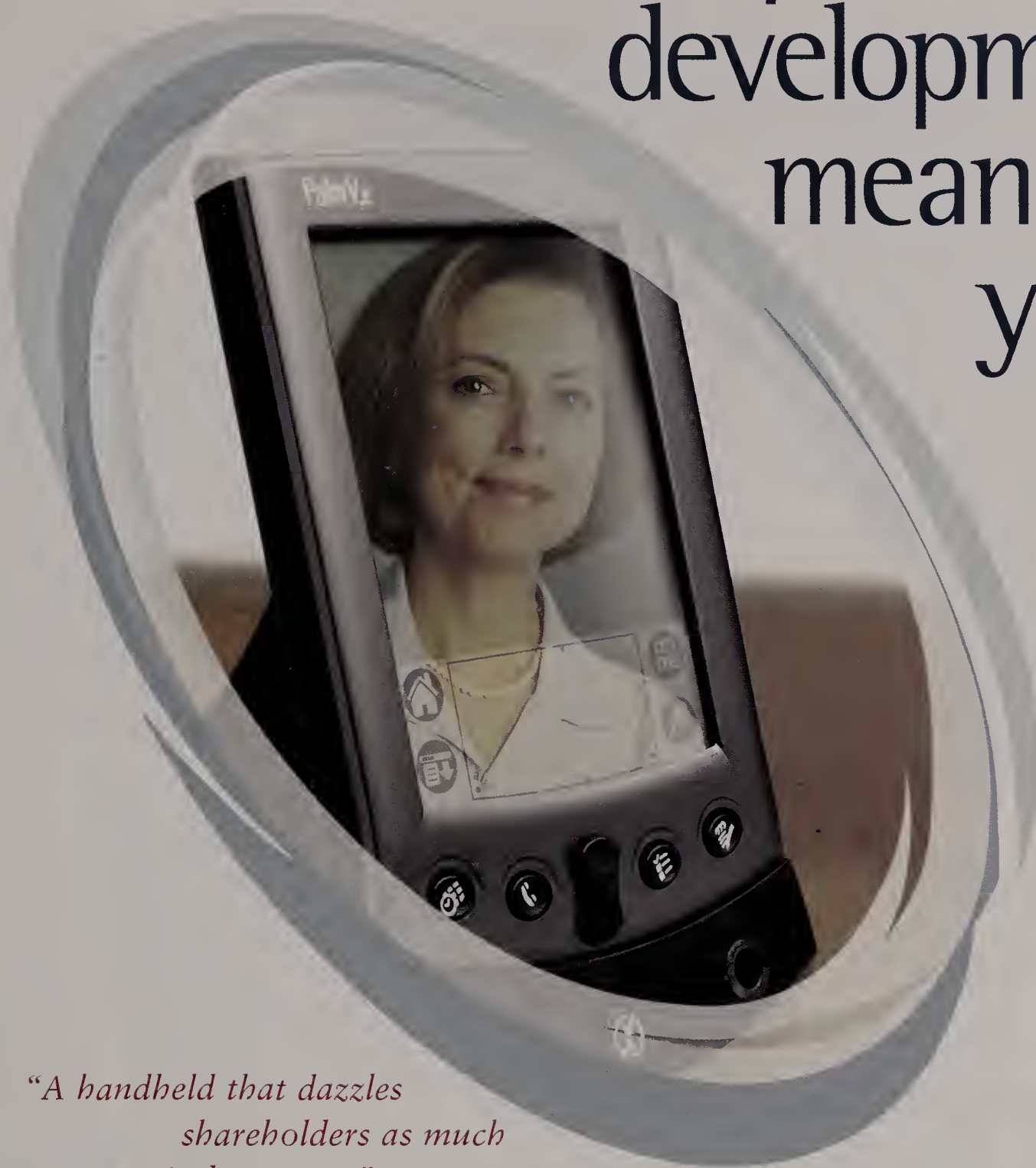
Other decisions are still being examined. In which country—or countries—should statements be mailed? Where should cards be embossed? And mailings sent from? “Coming in as an outsider, you can make a lot of mistakes,” says Doran. One option under consideration is to partner with European companies in joint ventures—an admission indicative of the challenges. “We would bring our information-based strategy, and they would bring their local knowledge and access.”

With a global—as opposed to purely European—presence for Capital One still firmly in top management’s sights, it’s clear that the next year or so will be a telling one for Capital One’s whole global strategy. Decisions that Doran make today will have consequences that reverberate for years. For a CIO who enjoys the sensation of intestinal butterflies, it’s just about the perfect job. ■

Divided We Stand

As Winston Churchill famously observed, Britain and America “were two countries divided by a common language.” The folks at Capital One doubtlessly pondered those words as they set up shop in the United Kingdom. It’s not just the fact that there are different regulatory authorities but also different reporting requirements and different laws. In the United Kingdom, the calculation of penalty charges for early loan termination needs to comply with the Rule of 78, an industry standard that’s not used in the United States. Add to that the differences in data availability and the stage at which companies are permitted to use it, usury laws and radically different personal bankruptcy laws, and you see what Churchill meant.

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WORLDVIEW | KOFFI M. KOUAKOU

Africa Awaits

The continent is hoisting an "Open For Business" sign—but there are pitfalls for the unwary

NOT FOR NOTHING DID THE VICTORIAN-era writers refer to Africa as the Dark Continent. Big enough to contain the United States three times and holding more than 50 mostly Third World countries, it's rich in both natural resources and horror stories. But as globalization slowly but surely reaches even the inner continent, CIOs from the First World are showing up, wanting to do business.

They're in for a shock. "Only innova-

tive CIOs survive in Africa," warns Adi Paterson, executive vice president and CIO of South Africa's Council for Scientific and Industrial Research (CSIR), one of Africa's largest technology institutions. CIOs with a "First World only" style will fail, he says.

It's not hard to see some of the difficulties. Imported business solutions often fail in Africa; the continent has slipped further and further into abject poverty and bad government, and information technology is still

seen as a toy for the elite and the wealthy.

Tough or Soft?

In such an environment, familiar First World traits either don't work or explode in your face. Tough-talking? Straightforward? Uncompromising? "Don't try it in Africa," warns Bob Day, executive director of information and communications technology at the University of South Africa in Pretoria. "Here, such arrogant attitudes won't work." And when they don't, the fallout is often acrimonious—look no further than the very public row recently surrounding South African Airways' former American CEO, who was accused of running the airline ruthlessly and being uncompromising on company cost-cutting and layoff decisions.

Instead, African CIOs recommend other tactics, borne of their experience with Africa's multiple environments in which they operate—cultural, technological, political and business. When it comes to working styles, for example, Day recommends acting "softly, softly," as historically Africans have tended to conduct their affairs through consensus, consulting before making decisions.

The Wireless Continent

If the management approach is different, the end objective is likely to be too. In the short term, at least, the African CIO's recipe for success must reflect the prevailing technology infrastructure, which has been revolutionized by wireless. Today's Africa has seen an explosive growth in the use of cell phones: It has become an indispensable tool for communication, business and trade—not least, of course, because the landline-based infrastructure is so poor in Africa.

South Africa's cellular system is only 7 years old, yet already there are more cellular subscribers than landline subscribers.

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Ninety-two percent of students use cell phones, according to a recent University of Pretoria study. "There is no question about it: The future of Africa is wireless," says Day. Smart wireless products that cater to needs in the neglected communities of health, education and entrepreneurship are the next killer applications in Africa.

But be warned that this is about as far as one-size-fits-all prescriptions go. While the rate of progress is happening faster in South Africa and in a few Mediterranean countries—chiefly Egypt, Morocco and Tunisia—it is lower down the agenda in other countries, an inevitable result of strife, famine and natural disasters.

Two Keys to Africa

Nevertheless, a couple of simple stratagems for success can be distilled. First, partner smartly—particularly with the overseas aid development sector, which has a budget and clout. As partnering prospects, organizations like The World Bank and the United Nations Development Program are hugely influential in the Third World. Both BMW South Africa and DaimlerChrysler South Africa are currently applying the development partnership approach in South Africa.

Second, learn to deal with the African government. Understand the lack of good governance, and learn to be patient as you deal with the dreadful regulatory investment quagmire in Africa. Plan for the medium to long term, rather than the short term.

It's a painful and fraught process. But remember, in Africa as elsewhere, risk balances reward. Africa is a tough and frustrating place for the incoming CIO—but also the last remaining business frontier. **CIO**

Contact South Africa-based Business Writer Koffi M. Kouakou at koffi@connexity.co.za.



Q & A | FRANCES CAIRNCROSS

Distance's Demise

ACCORDING TO BRITISH AUTHOR Frances Cairncross, a senior editor at *The Economist*, the world has yet to wake up to the implications of what she describes as "The Death of Distance."

Intending to merely revise a book of that name that she authored in 1997, Cairncross instead found that a whole new volume, *The Death of Distance 2.0* (Texere, May 2001), emerged as she surveyed the still-unfolding possibilities unlocked by the power, reach and changing economics of global telecommunications.

Q: What kind of revolution are you predicting?

A: The analogy I use is the automobile in 1910. By then, these were recognizable as cars, but it took most of the rest of the 20th century for their social consequences to emerge. In telecommunications terms, we're still back in 1910. As a mass medium, the Internet is less than a decade old—yet already 385 million people around the world have been introduced to the idea that it costs no more to visit a bookstore in Seattle than one on their High Street. Similarly, wireless technology is killing location: You can work wherever you happen to be. Broadband will reduce the cost-per-bit to close to zero.

Q: And how prepared are we?

A: Companies—and investors—have yet to adjust to the slimmer margins brought about by greater price transparency and more competition. And also to the fact that they will become niche specialists rather than vertically integrated behemoths. Individuals have yet to recognize that the boundaries between their work and home will increasingly blur. And governments still think that within their national boundaries, their rule is law. But as content sweeps across national boundaries, enforcement becomes increasingly problematic.

Q: Is there any good news?

A: Oh, yes—there are positives as well as negatives. As individuals, we'll lose a lot of our privacy, for example. But as our privacy disappears so will a lot of the crime that we fear, thanks to the pervasiveness of electronic surveillance, audit trails and the capture of biometric data such as fingerprints and retina patterns. There is a balance.

—Malcolm Wheatley





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i n v e n t

How Nasdaq Back

SPECIAL

Nasdaq was back up and trading only six days after the World Trade Center catastrophe. In this CIO interview, Nasdaq CIO and Executive Vice President of IT and Operations Gregor Bailar credits distributed systems, contingency planning and a redundant architecture for the exchange's resiliency. Not to mention some very dedicated people.

BY TOM FIELD

Where were you on Tuesday morning, Sept. 11?

BAILAR I was in Greenwich Village [about 10 blocks above the World Trade Center] heading north in a hired car. We didn't hear the crash, but we stopped, turned and saw the smoke. It wasn't clear what was going on. One Liberty Plaza, which is across the street from the World Trade Center, is Nasdaq's headquarters, with mostly executive staff and sales staff, not operational staff. Our offices are on the 49th and 50th floors of that building; they saw the first plane hit. I immediately called headquarters, and they said, "Everything seems OK." Next I tried to call my wife. I had trouble but eventually got a message through. Then I called Connecticut, where our primary data center is. It appeared that we didn't have any issues.

Then the second plane hit. I thought: two planes, direct center of two different towers. Time to batten down.

I jumped in the car and told the driver,

"We've got a major problem here; they just took out our two financial center buildings. Let's get out of here and get to our Times Square site, where I know we have a lot of security staff, and let's get this market locked down."

What was happening at 1 Liberty?

They began evacuating after the first plane hit. Our security guards on their own accord evacuated our floor at least, so most of our people were on the ground when the second plane hit.

What did you do next?

We drove to Nasdaq's market site, a building where we have a press studio and broadcast studio in Times Square. At the market site a group from the press was asking, "What are you going to do with this building? Shouldn't we evacuate?" We needed to keep it up as our command

Bounced



“They said, ‘Gregor, we need your confirmation that we need to pull the markets.’ Everybody stopped talking, and I said, ‘Yes, halt the market.’” –Gregor Bailar

center, so I was not interested in shutting it down. At 9:15, I determined with the rest of our staff that it would be necessary to keep the market closed at least until 10. Later we made the decision to shut down the market for the whole day.

Halting the market wasn't a step you could take lightly.

We've never done that in the securities market, period. I remember that moment vividly because there were a lot of people on the phone call—40 or 50 people—including senior management for Nasdaq, the New York Stock Exchange, the SEC. I was the ranking executive for Nasdaq, and my cell phone was fading in and out. They were saying, "Gregor, have you made the decision?" and I was saying, "Yes, halt!" They didn't hear me. They said, "Gregor, we need your confirmation that we need to pull the markets." I pressed some phone buttons so that the tones would stop the conversation. Everybody stopped talking, and I said, "Yes, halt the market."

How did the command center operate?

When the first tower fell, it took out the power in Lower Manhattan, and in fact Nasdaq had a telephone switch there that was serving the market site in Times Square. So our market site telephones went down. We moved essential staff over to the Marriott Marquis [a hotel in Times Square] and sent the rest home.

At the Marriott, we went through a progression of information gathering. The first thing we had to understand was our personnel situation. Then we broadened the investigation to learn who was affected among our traders. Then we had to understand the situation from a physical perspective: Did we lose a building? Did we lose a data center? Did we lose connectivity? What have we got in the way of physical damage that's going to take a long time to restore? Next we needed to know the regulatory situation: Are people trading today? What's the landscape of the trading industry? It was literally in that order.

How did you handle those tasks?

In our Maryland center, they immediately set up a central depository for information about where all of our people were and who was unaccounted for. We had two people we couldn't account for who we thought could have been in one of the towers; but it turned out they never got there. We also used this depository to track where all our executives were. So if you needed to get in touch with any executive, you would call that center—it was the executive locator from that moment on. Every hour or every two hours a listing would come through saying here's where Frank is, here's where Gregor is, with phone numbers. That was very important because a lot of us were on the move from site to site.

We also had a group in our Maryland center focused on the regulatory processes. Nasdaq trades from 8 a.m., so things had already occurred that day. We had to figure out how that would be affected if we restarted trading or kept it closed.

As for our trading companies, we could see by our network monitoring that there were certain sites that were not responding. We were pretty sure that there were 40 to 70 firms that had problems based on that monitoring.

Some of your traders were in trouble, but Nasdaq's systems were all up?

Nasdaq is highly redundant, so just because we may have an office gone or they turn off the electricity in Lower Manhattan didn't mean we were knocked out. We have servers in different buildings. Every single one of our traders is connected to two different Nasdaq points of presence or connection centers, and there are four connection centers alone in downtown Manhattan, none of which were really affected.

Including Manhattan, there are 20 connection centers around the United States, and every single server connects to two of those centers through two different paths, and often through two different vendors.

CIO.com

Find more on Nasdaq's redundant systems and on **DISASTER RECOVERY** basics at www.cio.com/printlinks. For more coverage of the **TERRORIST ATTACK RECOVERY**, see www.cio.com/online/crisis.html.

How did you help your traders get back online? Obviously, this was a big factor in reopening the markets.

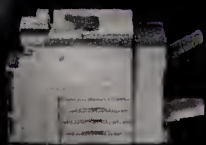
By noon on Wednesday we had confirmed that if we reopened, 60 percent of the Nasdaq trading volume would be ready to trade. By the end of the day we called more than 300 firms, and of that only 30 were not going to be operational by the next day. We sent nearly 100 people from our centers to work with these folks. We were also given resources by Cisco, Dell and WorldCom. On Wednesday we had about 10 trading companies that were going to have to operate out of their backup centers. One of those had to be built entirely from scratch. We knew it would take at least until Friday for a couple of the companies to provision their backup sites. Meanwhile, on Wednesday I went to several meetings organized by Mayor [Rudolph] Giuliani specifically to look at the telecom and infrastructure of Lower Manhattan and discuss how we would deal with access and security. By Thursday's discussions, we saw that the New York telecommunications infrastructure just wasn't getting there. Access to the downtown buildings wasn't available yet. That was when Monday was decided for the reopening.

How did you prepare for Monday?

We started industrywide testing on Saturday at 7 or 8 in the morning, and by 11:30 that morning, we had achieved 98 percent of the volume. And then on Sunday we did a half-day of retesting with people who wanted to add a little more volume capability. Then we sent people home, saying, "Get some sleep guys. We've got a big day tomorrow." And people were in at 6:30 Monday

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“People will have to look very carefully at their backup strategies and see whether they can communicate with everybody easily.”

morning to make sure everybody was connected and up and running.

On Monday we had amazing volume—a 2.7 billion share day. There were a couple of firms that had more volume than they thought they could handle, so there may have been a couple of phone calls that didn't get answered. We traded something near 5 billion shares that day between Nasdaq and the NYSE, which is a healthy volume on any day. To have that come six days after you literally were in the cross-hairs of a terrorist attack...people were pretty happy. People were screaming happy.

What did Nasdaq lose over the downtime and what did it cost to get back up?

We have interruption insurance, so we hope to recover most of it, but it's in the millions, and it could crest tens of millions.

What were the disaster recovery lessons for Nasdaq?

We learned that distributed systems are really good. You have to think about how your business has concentrated people or operational centers in certain places. You've got to consider if it's the wisest distribution. We feel we were lucky having some folks in Connecticut and some in Maryland. Even if we had lost some of our senior management at 1 Liberty Plaza, we would have still had a senior team.

This event validates the distributed organization.

It certainly validates caution in how you concentrate your operations and staff. If you couldn't get access to southern Manhattan, and that's the only way you could open your doors, then you were in trouble. The other validation is one of network topology—to know that there are

two network topologies, never just one—and we've been religious about that.

Were there other lessons? Are you going to change anything?

We did have extensive [crisis management] rehearsals for Y2K and for our conversion to decimals, and in these cases, the securities markets really worked together. So it was a natural thing for me to set up a nationwide teleconference for all the exchanges in the U.S. at noon every single day and say, “Hey folks, we want to talk about what's going on.” We made decisions as an industry, and our openness of communication was critical.

One thing we're going to try is to formalize more of these communication forums. We'll want to trigger those automatically with the SEC. Trading is still a New York-centered industry, so there are also some things that we want the New York City government to do around communications. But you can't script the rest. You have no clue what the next disaster is going to look like. Will it hit a power substation? Will it hit the trains coming in so none of the traders can get in? You really need to be able to communicate and have a place for people to talk about what's going on. We already require many of our executives to carry two cell phones, each with different service providers. We are focusing on making sure the network is resilient and that the design is able to endure and that we can communicate.

After living through this, what would you advise other CIOs to consider?

This was a true test of people's backup strategies. Did you ever test your backup strategy? Have you worked out of your backup center? Do you know how to get

people there? Do you know the critical phone numbers? A lot of people don't have phone numbers as part of their continuity of business plan. I think people will have to look very carefully at their backup strategies and see whether they can communicate with everybody easily, whether the phone numbers are not stored in that same building that could experience the disaster, and whether they've got hot backups. Hot backups are going to be much more popular than they have been in the past.

Any last thoughts about your experience?

I'm very proud of Nasdaq and their response, and I'm proud of the industry because it was an incredibly tough time. People were caught up in emotions you can't imagine. Many of our staff have been going to memorial services almost daily. Yet throughout that they're coming to work. Not with smiles on their faces but with determination and with no negativity. Everybody got counseling the first day. Giuliani visited with a lot of our people at different locations, and there was just an outpouring of community you don't get too often in normal daily life.

How did this affect you personally?

The emotional hit didn't come until Friday night, when I got to my house [in suburban Washington, D.C.] for the first time since Tuesday. My kids were asleep by the time I got home. My wife had to go out, so I was alone there. That's when it hit me. **CIO**

EDITOR'S NOTE: As CIO went to press, Gregor Bailar accepted the CIO position at credit card company Capital One, where he was scheduled to start Oct. 24.

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Inadequate security leaves companies open not just to hackers but to lawsuits. Here's how to stay out of court and protect your company. And in "Miller's Privacy Warning" (Page 72), Arthur Miller argues that the CIO's responsibility extends to protecting people's privacy. BY SARAH D. SCALET

See You in Court

JUST BEFORE 8 A.M. ON FEB. 1, 2001, C.I. HOST, A WEB-HOSTING COMPANY WITH 90,000 CUSTOMERS, WAS hit with a crippling denial-of-service attack. By the end of the day, after outage complaints from what CEO Christopher Faulkner described as "countless" customers, the Fort Worth, Texas-based company got its lawyers involved.

Faulkner's company aimed its legal wrath not at any hacker but at another business, Exodus Communications, and five of its customers. As the nation's largest Web-hosting company, Santa Clara, Calif.-based Exodus (which at press time filed for Chapter 11 bankruptcy protection) has served up the websites of such household names as American Airlines, eBay and General Electric. In an injunction filed in a Texas district court and later moved to a U.S. district court, C.I. Host alleged that the defendants committed or allowed a third party to commit a denial-of-service attack on C.I. Host's systems. The defendants insisted that they were victims of a hacker themselves, not the perpetrators of a crime.

Reader ROI

- Realize why lawsuits over failed information security are imminent
- Determine how your company may be liable for damage caused by hackers
- Learn how to prepare and respond

The case never made it to trial, but C.I. Host's lawyers did convince a Texas judge to issue a temporary restraining order shutting down three of the Web servers involved in the attack until the companies could prove the vulnerabilities had been fixed. This messy and confusing case pitted not just rival against rival but victim versus victim. Although the attacks lasted only a couple of days, it took seven month's worth of legal fees, not to mention time and energy, to close the case.

This scenario and other similar ones are likely to play out with increasing frequency as more companies suffer public outages and thefts as a result of security breaches. And it raises a crucial question that the courts have yet to decide: When information security fails, who's to blame?

The hacker is at fault, to be sure, but experts say it's only a matter of time before judges and



juries have to decide whether companies that are victims of a security breach can be held liable for having inadequate security. Only CIOs who understand this legal minefield will have the answers their company needs to hear—and know how to protect their business not only from hackers but also from legal actions that may follow in the hackers' destructive wake.

The Next Asbestos?

To hear some people tell it, corporate liability for failed information security is the coming apocalypse. Several experts predict a flurry of personal injury lawsuits filed by customers whose personal information has been disclosed, corporate lawsuits based on damage caused by security breaches at business partners and class-action lawsuits filed on behalf of irate stockholders.

"It's going to be the next asbestos," Ed M. McPherson III, Atlanta-based director of PricewaterhouseCoopers, recently told a group assembled in New York City to learn about cybercrime's impact on shareholder value.

Security vendors are banking on it. For instance, Redwood, Calif.-based Recourse

Technologies worked with Daniel Langin, a defense attorney for several early Internet cases, to explore whether corporate officers could be held personally liable for information security breaches. His conclusion? You bet. "It takes one clear bellwether case to say

It's only a matter of time before judges have to decide whether companies that are victims of a security breach can be held liable for having inadequate security.

you have this liability, before officers and directors wake up," he says.

"It's not a 'sky is falling' issue," says one CIO when asked about the likelihood of such lawsuits. Like many organizations, his large hospitality company forbids him from discussing the terms *legal* and *security* in the same breath, at least for attribution. "This is what the intelligent, forward-thinking company is thinking about. We believe that we've taken every possible precaution, and we're looking for every possible thing on the horizon," he says.

Lawmakers are taking precautions as well. Members of Congress, most prominently Sen. Robert Bennett (R-Utah), think liability lawsuits are a real enough risk that they're drafting legislation to mitigate the threat. Along with Sen. Jon Kyl (R-Ariz.),

Bennett drafted a bill that would exempt businesses from Freedom of Information Act disclosures, antitrust prosecution and lawsuits resulting from the disclosure of cybersecurity information. In the House of Representatives, Tom Davis (R-Va.) and James Moran (D-Va.) have introduced similar legislation that would prevent voluntarily submitted information on security problems from being used in lawsuits.

Although critics have argued that such legislation would grant too broad a scope of immunity to businesses, the tenor of the discussion has changed in the wake of the Sept. 11 terrorist attacks in New York City and Washington, D.C. The argument for protecting the nation's IT infrastructure gives more weight to the views of those who advocate companies' sharing information with the government. Realizing that a security problem at one organization could be just the first domino, they hope to address mounting concerns about how a successful attack on an electric company, for example, could cause downstream outages to telephone systems, banks and many other services upon which citizens rely.

Meanwhile, judges have started assigning dollar values to security breaches. In courtrooms across the country, criminals have been ordered to pay hundreds of thousands of dollars, in addition to serving time. The problem is, hackers often have empty pockets, and the damage they do often far exceeds their own financial gain, if any.

Security Versus Privacy

The distinctions can be confusing, but security and privacy are indeed different issues

WITHOUT SECURITY, there can be no privacy, so the two subjects are forever entwined. Legally, however, the issues are quite different. Fred H. Cate, professor of law at Indiana University and senior policy adviser to the Center for Information Policy Leadership, explains the distinction as succinctly as anyone. "I think of privacy as the use of the data by somebody you gave it to, and security as the theft of the data or the interception of the data by the unknown third party," he says. "If I buy a ticket from Travelocity, what Travelocity does with my data is a privacy issue. If somebody hacks into Travelocity and steals that data, that's a security issue. And we've had a tendency to confuse the two."

Although some cases do involve both security and privacy, two sets of legal precedents are likely to emerge. Privacy lawsuits—such as the ones well-known Attorney Arthur Miller discusses on Page 72—involve business decisions to use information in a certain way. The security-related lawsuits discussed in this article involve situations where information security fails, causing an unintended use of information or systems.

—S.S.

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Enter the banana peel theory—you slip, and someone else should pay.

“Some lawyer is going to figure out where the deep pockets are and is going to chase them,” says Attorney Mark Grossman, chairman of the computer and e-commerce law group of Becker & Poliakoff in Miami and the TechLaw columnist for *The Miami Herald*. “My own profession can make me lose yesterday’s lunch. Sometimes we earn our reputation. It’s the American psyche: Something goes wrong, someone else should pay for it. It’s one of our failings. Juries like to

give deep-pocket money away when some small third party gets hurt.”

Lawsuits Looming

To date, *CIO* has not found any such liability lawsuits. However, several sources indicated that third-party damages are being quietly settled out of court. As a rule, it’s cheaper for companies to make confidential settlements than to defend themselves. It also helps avoid publicity that might give stockholders and customers pause.

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American International Group (AIG) has paid out millions of dollars for Internet risk-related claims, most as third-party damages. “Third-party liability insurance is by far our most popular option,” says Ty R. Sagalow, executive vice president and COO of AIG E-Business Risk Solutions in New York City, which has sold more than 1,200 cyberinsurance policies since it started offering the coverage in early 2000. He’s mum on the details, but says the first concern companies have when purchasing insurance is often that they’ll get sued if something goes wrong.

Related issues have started to make headlines. In September, the world’s largest financial services company found out the hard way that putting customer information into the wrong hands could lead to a lawsuit. Citibank and its New York City-based parent company, Citigroup, were served with a class-action privacy lawsuit alleging that the companies illegally disclosed private financial information to telemarketers and vendors. Citigroup was not available for comment. (For information on other privacy lawsuits, see “Miller’s Privacy Warning,” Page 72. To understand the overlap, see “Security Versus Privacy,” Page 64.)

In August, the Washington state attorney general’s office asked Qwest Communications to refund DSL customers affected by Qwest’s outages while it fought the Code Red worm. The Denver-based company insisted that the Code Red problems were not its fault. (See “Code Red: Phase Two,” Page 68.)

Also, the Federal Trade Commission is investigating an internal security bungle in which drug manufacturer Eli Lilly accidentally revealed the e-mail addresses of 700 Prozac users. At least one customer complained to the American Civil Liberties Union that the security breach violated his





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privacy. In a letter to the FTC requesting the investigation, ACLU Associate Director Barry Steinhardt quoted Eli Lilly's security and privacy statement, and asserted that the Indianapolis-based company had violated its own promise of confidentiality. The FTC won't release details until its investigation is complete.

C. Lee Jones, chairman and CEO of AmericasDoctor in Gurnee, Ill., and former vice president of IT of global pharmaceutical business at Abbott Laboratories, is one of many CIO-types watching with concerned skepticism. Jones says he would be shocked if the Eli Lilly incident didn't result in legal action. "The lawyers follow the blood trail," he says. "They're like sharks out there. When you have ill-defined laws, you're going to have attorneys try to set precedent."

Security Safeguards

CIOs looking for a sure way to avoid the coming deluge of legal action aren't going to find one. "Anybody can sue anybody for any reason at any time," says Bruce L. Dean of Karger, Key, Barnes & Springer in Dallas, one of the defense attorneys in the C.I. Host case. "All it takes is money and convincing a lawyer to file the case."

Dean got the June 2002 trial date scratched from the court's calendar by arguing that his client, the Santa Clara, Calif.-based Web-hosting company Wintelcom, didn't have any business ties in Texas. Future cases may require more than that. Attorneys agree that CIOs should follow the "prudent man rule"—a legal term that Attorney Langin explains as, "the duty to do what a prudent person would do to protect information assets."

To keep lawsuits from sticking, Langin and others offer these tips.

■ **ESTABLISH AND IMPLEMENT AN IN-HOUSE SECURITY POLICY.** This number-one security best practice involves setting and communicating rules for how your company protects and handles data. Milwaukee-based FBI Agent Mark Bowling points out that if a company has a

security policy, "then you can demonstrate that you have standards you adhere to. We've certainly found instances where you have [victims damaged by an attack on someone else], where the primary victim's security was not as sophisticated or as well-documented as it otherwise could be."

■ **HAVE A SECURITY AUDIT DONE.** Once a company has a policy, officers should make sure it's being followed. Security firms, corporate auditing companies and even insurers can conduct independent

tests of a company's security measures—from physical weaknesses to the configuration of firewalls to how vigilant employees are about protecting information assets. "If you have a third party come in and review [your information security], then it helps prove your case," explains Theodore Claypoole, an attorney for Womble, Carlyle, Sandridge and Rice's technology transaction group in Winston-Salem, N.C., and former in-house legal counsel for Bank of America and CompuServe. "You can say, 'Look, we

Code Red: Phase Two

Companies are still sorting out who is at fault after the Code Red computer worm

QWEST COMMUNICATIONS thought its problems with the Code Red worm were finally over. Then the Washington state attorney general's office stepped in.

After receiving complaints from 15 to 20 customers whose DSL coverage was interrupted for 10 days in early August, the attorney general's office asked the Denver-based company to give refunds to customers—at least one of whom says he lost \$5,000 of business during the outage. An e-mail exchange, obtained by CIO through a public records request, provides a rare glimpse behind the curtain when customers, companies and attorneys try to assign blame after a security breach.

"Please tell me how a company gears up for something like the Code Red worm virus?" Qwest executive Debbie Magnus asked the attorney general's office in an e-mail dated Aug. 17 in response to an e-mail asking the company to issue refunds. "Qwest and Cisco have made every attempt to work with the customers on this problem. The problem is not the modem, the problem is the virus. Qwest is not crediting for the virus problem."

Steve Larsen, director of the attorney general's cyberconsumer-protection division, responded that same Friday. "There are a number of companies that did protect against this virus when it came out in July and even before.... It seems reasonable that a customer should not have to pay for service they can't get. If you can't watch your cable TV or your newspaper doesn't show up for days or weeks at a time, I assume you won't pay." Larsen then cited an article in that day's *Seattle Times*, reporting that DSL customers with the same modems but different DSL providers fared better during the Code Red incident.

"Guess I killed the messenger," Magnus responded on Aug. 21, explaining more about the worm and how customers could apply a patch. "The credits are through the repair office just as normal repair credits are issued. Keep [the complaints] coming, just as you are supposed to, and I will keep responding without wounding you anymore."

Nevertheless, in early September a spokesperson for the attorney general's office said the complaints were still outstanding.

—S.S.

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spent money to have a reputable company review our procedures; we took those suggestions, and we made those changes.”

■ **REMEMBER SECURITY IN CONTRACTS.**

Legal counsel and information security specialists should work together on putting security parameters into contracts with business partners and outsourced service providers. Then they should do their homework. “Clearly you have much less control over an outside party than you do over your own employees, and it’s vitally important for a company entering into an outsourcing operation to actually check the security of the contractor’s computers rather than just leaving it as a matter of agreement,” Claypoole says.

■ **DON'T MAKE PROMISES YOU CAN'T KEEP.** Companies shouldn’t set themselves up for a breach-of-contract lawsuit with

overzealous marketing or sloppy promises. “I think if you look at privacy policies [on websites], you’ll see that,” says Fred H. Cate, professor of law at Indiana University and senior policy adviser to the Center for Information Policy Leadership. He points out that wise companies say they use “appropriate security measures” rather than promising perfect information security.

■ **PAY ATTENTION TO REGULATIONS AFFECTING YOUR INDUSTRY.**

The Gramm-Leach-Bliley Act for the financial services industry and the Health Insurance Portability and Accountability Act for health-care companies dictate how customer information should be protected. Companies that do business overseas may have to follow rules established in other countries, such as the European Union’s strict guidelines. Companies that don’t meet those requirements will face penalties or lawsuits.

■ **CONSIDER PURCHASING E-COMMERCE**

INSURANCE. Basic business insurance policies typically do not cover the risks associated with doing business online. Cyberinsurance, which is offered by established insurance groups such as AIG and newer, e-centric groups like Insuretrust, fill the gap by covering liability and direct damages from information security breaches. The cost of cyberinsurance varies, based on the size and scope of an organization’s computer systems and how thoroughly the company has addressed security. Many security experts predict that in the future, these policies and the standards they impose will shape how companies protect their systems.

■ **PAY ATTENTION TO WHAT SIMILAR COMPANIES ARE DOING.**

Because so many companies are bungling security, it may be simple to prove you’re doing as much as anyone else. “Everybody has bad security today,” says Steve Hunt, a Chicago-based analyst with Giga Information Group. “There’s simply not an awareness or an understanding of what is good security.” The best you can do is prove you’re trying—that you’re doing as much as the company next door.

So that’s it, folks. The best defense for this impending legal hassle is a much-advised, often-ignored list of best practices. The question is whether the gathering clouds will have the proverbial silver lining and generate an incentive for companies to act on security best practices. In the process of doing so, they just might prevent hackers from doing damage in the first place.

“There’s always going to be that rare group of people who want to take advantage of the system,” says Bette Walker, CIO of Energy and Chassis Systems for Delphi Automotive Systems in Flint, Mich. “Security *can* become a legal problem. I think of it first as preventing a problem from occurring. Then the next step, I don’t have to worry about.” **CIO**

Understand the Risks

Looking for a few good reasons to improve security?

Attorneys say the following scenarios are likely to result in lawsuits, which may not be covered by normal business insurance. A company’s best defense will be proof that it follows security best practices—from establishing an in-house security policy to testing how well those procedures actually work.

BREACH OF CONTRACT: When a business violates a nondisclosure agreement or fails to live up to a privacy statement made to customers.

DENIAL-OF-SERVICE ATTACKS: When a company with a legal obligation to keep its website up is hit by attacks that cause an outage or when a company plays an unwitting role in a denial-of-service attack launched on another company.

MALICIOUS CODE: When a computer system transmits malicious code to another computer system, thereby causing damage and financial loss. This includes viruses or worms sent through e-mail.

PERSONAL INJURY: When hackers steal or publish personal information. Customers could sue for damages under the same laws that allow injured customers to sue stores for not scraping the ice off their steps.

INAPPROPRIATE WEB CONTENT: When information on a website violates a copyright or trademark or is libelous. American Insurance Group also has settled claims for policyholders whose websites were defaced by hackers.

NOT PROTECTING SHAREHOLDER VALUE: When a security breach results in a significant loss, either of money or customer confidence, causing the stock price to plummet.

—S.S.

Sarah D. Scalet, senior writer and security editor, can be reached at sscalet@cio.com.



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Information security lapses present one front of a looming courtroom battle (read "See You in Court," Page 62). Legal Expert Arthur Miller says CIOs and corporate America also have to protect people's privacy—or risk a jury's wrath.

BY ALISON BASS

Miller's Privacy Warning

AS AMERICA GIRDS AGAINST TERRORISM, FEDERAL PRIVACY REGULATIONS THAT RESTRICT THE

exchange of data online will probably take a back seat to law enforcement's need to know. But that doesn't let corporate America off the hook when it comes to protecting the privacy of consumers. Harvard Law Professor Arthur Miller, the former host of the TV show *Miller's Court* and one of the country's best legal minds, says corporate executives should be especially concerned about protecting their companies and themselves from class action lawsuits stemming from the intrusive use of personal data gathered online. And if that's not enough to scare any right-thinking CIO, Miller—a longtime expert on the impact of technology on privacy and author of one of the first books on the subject, *The Assault on Privacy: Computers, Data Banks and Dossiers* (University of Michigan Press, 1971)—has himself become involved in several of these high-profile cases.

In a recent interview in his cluttered book-lined office at Harvard, the courtly looking Bruce Bromley, professor of law, expounded on the principles behind these lawsuits and discussed the line corporations should be careful not to cross when collecting and using their employees' and customers' personal information.

PHOTOGRAPHY BY MARK WILSON



CIO: You've been writing about privacy issues for the past 30 years. How has the Internet changed the tenor of the debate?

MILLER: Before the computer came along, the greatest privacy protector was that you could never find anything. The safest place in the world was a manila folder in some file drawer. I certainly can't find things in my files. [He laughs and gestures helplessly around his office, where stacks of papers cover every available surface.] The computer has changed that calculus. Now you have the ability to record everything, and you get a mentality that it's important to record everything. And the Internet allows direct marketers to come into people's homes and offices and buy privacy. It has changed the scale of [intrusiveness] to a degree we could never contemplate before.

But the industry pollsters say that Americans don't really care about privacy in this new age. After all, consumers keep giving websites personal information in order to do business online, so how much do they really care about privacy?

I think it depends on how you phrase the question. If you put the issue of privacy in terms of civil liberties or medical records, you get very strong pro-privacy reactions. But if you put it in terms of accessed goodies, then it becomes a trade-off, which leads one to believe that Americans care less about privacy in the commercial context than they do in the medical or employment context. And it's clear that in certain environments, Americans are willing to sell their privacy. Give them a freebie online and they'll give you some of their privacy.

Which is the greater threat: hackers who are looking to steal data or the sale of private information to third parties?

In terms of dimension, the bigger problem is the free movement of personal information in the economic system. Yes, there are hackers out there, and you have to protect

your systems against them, but I don't think they pose the privacy threat that the self-interest of an entity to sell or exploit data possesses. Information is so valuable, and circumstances are so unpredictable. Look at all those dotcoms that have folded up; their only asset is their customer base, so they have every incentive to sell that. And there's a lot of stuff going on out there that's on the fringe of being very, very intrusive. Like the rampant, uncontrolled use of cookies that give corporations information about your susceptibilities.

Even beyond cookies, many corporations invest tremendous resources in CRM systems that capture personal data and use it to target customers more effectively—for example, by segmenting them into high- and low-value customer groups and then treating them accordingly. Do people recognize the extent to which their personal information is being used in this way?

I don't think Americans understand that someone is capturing data on them every time they do something, whether they buy

would say, "Look, we'd like to put you on a [subscriber] list and sell it, but if you tell us no, we'll take you off the list." Now consumers don't often get that choice. And they don't know what the consequences of opting out are. You don't know if you go on a special list of opt-outs and then get treated as a shabby customer. It's one thing to say, "Well, if you opt out, I'm not going to put banners on your screen." It's another thing to say, "I'm going to sell your name or treat you like a second-class citizen." [For example, by putting you on hold for longer than customers who have opted in, or not giving you the same discounts that might be afforded a more cooperative customer.]

What's the downside, if any, of not telling your customers what you're planning to do with their information?

We've already seen a wave of litigation around the cookie business. Privacy buffs have gone after DoubleClick [a New York City-based company that tracks consumer preferences for advertisers] in several

customers. Then again, privacy may get indirect help from people's mercenary instincts. Retailers will realize that you won't come on the Web if you think somebody's going to steal your credit card number.

The invasions of privacy I see are not invasions by Big Brother. They're not invasions by a malevolent government. They are invasions that occur because people see an economic motivation to capturing personal data, and they want to market something. The question is, Have you given people a choice to be part of that marketing scheme or not?

Which method do you think is more effective in protecting privacy, the opt-in one that Europe has or the opt-out method that most U.S. companies employ?

Opt-in is a little tough. If you go to an opt-in system, you could do serious damage to the economic vitality of marketing, and that's not something I want to achieve. Opt-out is less dangerous from that perspective, but maybe it has to be reinforced by full information as to what you're

opting out of or why you might want to think twice about opting out. A number of countries in western Europe do something we haven't done yet and that is they have a privacy ombudsman—a civil servant whose job is to represent the people in their dealings with corpo-

rations and government agencies. Just to make sure people are dealt with fairly.

Will privacy concerns be a major stumbling block for e-commerce and the exchange of data online? If so, what can be done to forestall that?

It depends on how upset people get. All you need is one horror story, one anecdote that creates a widespread loss of confidence. And that would have serious economic consequences. That would sour online commerce for a lot of people. A lot of dotcoms [including AmeriCounsel.com,

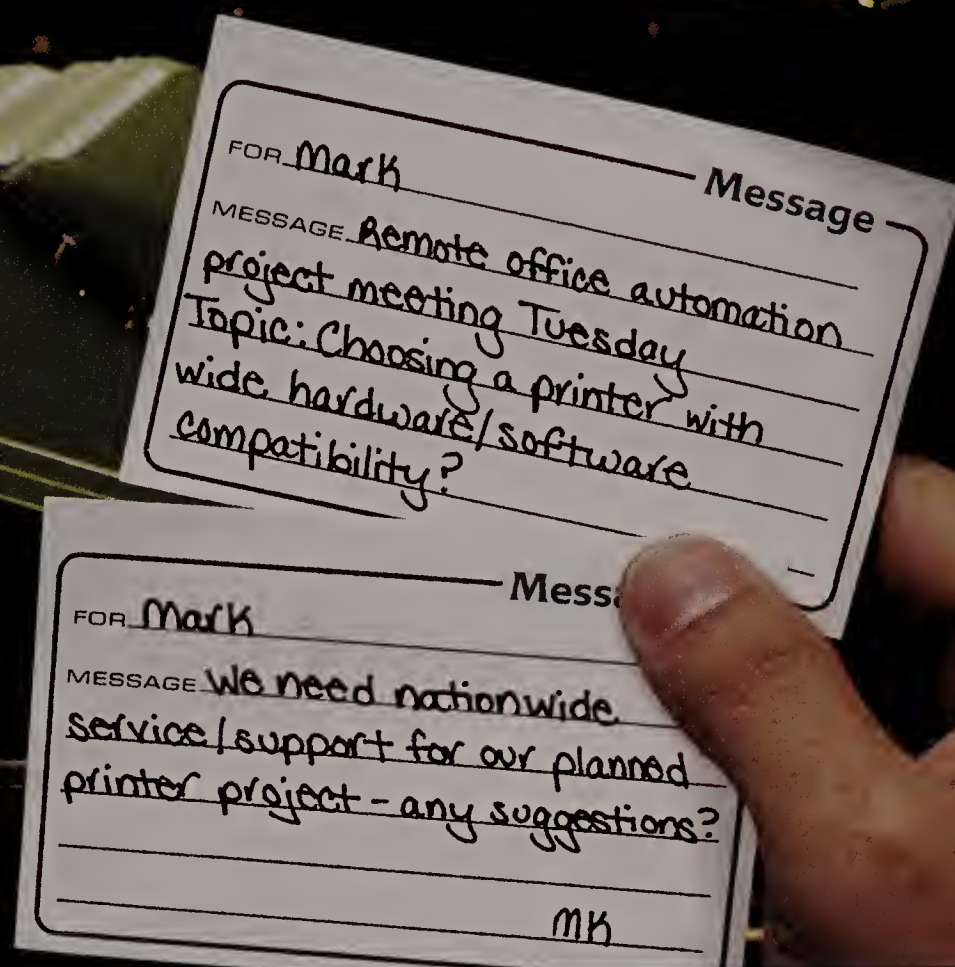
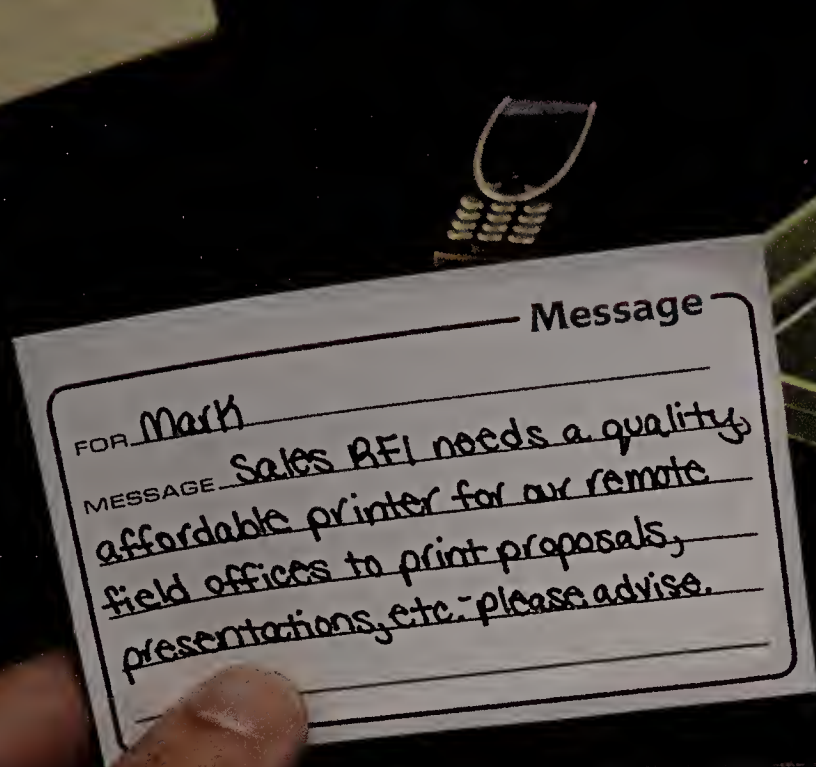
"There are hackers out there, and you have to protect your systems against them, but they don't pose the privacy threat that the self-interest of an entity to sell or exploit the data possesses."

something on Amazon.com or use the Net to book an airline seat. And when people are affected by this, they don't even know it. I mean, say you get turned down for credit. How often can you figure out why you've been turned down for credit?

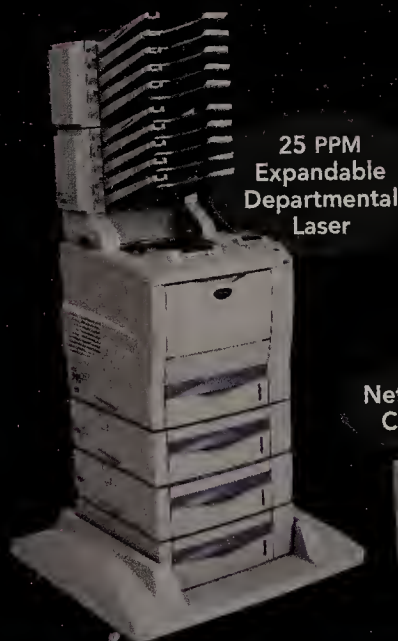
I don't mind if people sell their privacy. You can sell anything you want in this country except your children. But what disturbs me is that individuals are not sufficiently informed to make intelligent choices. You know, way back in the early days of this business, at least *Reader's Digest* gave you a choice. The magazine

lawsuits. What some people argue is that collecting information in this way is no different from wiretapping or eavesdropping. It's an intrusion, and it goes to the complete absence of consent. Unfortunately, the federal statutes are so primitive—they were enacted at a time before cookies were understood—that a lot of courts are going to have difficulty applying the laws to prevent this kind of privacy intrusion.

However, to make the Web work economically, companies will have to provide some security and confidentiality to their



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a venture Miller was involved in] failed because of the basic difficulty of getting people to readjust their thinking. When they think of legal assistance, for example, many people want to sit down with someone they trust; they want a face behind the advice. But much of law as it affects the ordinary person is cookie-cutter stuff, like advice about wills or buying a home, and you don't really need a face to do certain typical things. AmeriCounsel.com was designed to provide that kind of low cost and stereotypical legal counsel. But people couldn't get used to the idea of giving up that kind of information online. I think eventually Americans will get used to it, particularly if their privacy is protected.

What kind of legal consequences should CIOs be concerned about as they build

pointing the gun at others. And that gun is legal liability. Juries have shown themselves capable of getting extremely angry when people are not protected and they could have been protected.

Does that liability extend to one company sharing customer data with another company?

Yes. I recently argued a case before the Supreme Judicial Court of Massachusetts involving the national drugstore chain CVS. It was giving identifiable prescription information to drug companies, and someone brought a class action suit. The question I argued before the court was whether this was a proper class action. The court said yes, that a class action could be brought against CVS on the theory that CVS had violated the relationship between

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attacks. There's no question there will be increased pressure to overturn privacy guarantees in the wake of Sept. 11. Still, privacy doesn't necessarily fall on that liberal and conservative line; there are a lot of very conservative forces that are pro-privacy and vice versa.

I'm big on medical privacy, so that's an area where I think regulations are necessary. In addition, some thought should be given to employee privacy. I think employees are entitled to a certain amount of privacy. Some states already have legislation around this; others don't. So it may be nec-

essary to have some federal legislation to protect employees in the workplace. That doesn't mean everyone has the statutory right to e-mail anything they want, but you have to make clear to people what their vul-

"A CIO has to be concerned about a safe informational environment for customers, because if calamity strikes and there were things you could have done but didn't, a jury will smack you across the snout with a two-by-four."

systems that capture personal data?

Every employer is required by law to provide a safe workplace for its employees, and that extends to a safe informational workplace. Similarly, a company and its CIO have to be concerned about a safe informational environment for their customers because if calamity strikes and there were things you could have done but didn't, some jury somewhere is going to smack you across the snout with a two-by-four.

Suppose, for example, that you're collecting medical data and your system is not up to standard. If there are security precautions you're not using and somebody hacks in, and Joe Smith gets hurt because his wife finds out he has AIDS or somebody engages in identity theft, your information system has some legal problems. Sometimes we have to protect people by

pharmacist and customer by providing identifiable information. CVS has since settled the case, and they're not doing it anymore. The question now is whether the drug companies who got the information will be held liable.

It's like the DoubleClick litigation. These lawsuits are designed to get companies to improve their practices.

But it's not clear how effective these suits will be, given the existing statutes. Are federal regulations that deal with cookies and other privacy issues inevitable?

Most of the privacy legislation that does exist was the product of a Democratic Congress in the 1960s and '70s. With the current Congress, I think passing such legislation will be an uphill battle—even more so in light of the recent terrorist

nerabilities are, that they are being monitored constantly. Most major employers do that now, and I think they understand there is a legal risk if you don't inform your employees about what's going on.

What about gathering data for e-commerce purposes? Will Congress intervene there?

As I said before, all you need is one nasty event to foul the water. I think a lot of companies exercising goodwill and common sense will make good decisions. But they will be tarnished, unfortunately, by the bad apples, by the people who try to sell data when they shouldn't. And it's a sad fact of life that we very often make policy in this country by anecdote. It's the squeaky wheel effect. **CIO**

E-mail Senior Editor Alison Bass at abass@cio.com.

Workforce Productivity

A hand holding a lit torch, with a bright beam of light extending across the lower half of the image. The background is dark, and the light from the torch creates a strong contrast.

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MSPs Say They'll Do It All For You

Hard on the heels of the ASP comes the latest outsourcing model: the MSP, or managed service provider. They say they're the answer to your prayers. Let's take a closer look.

BY ERIC BERKMAN

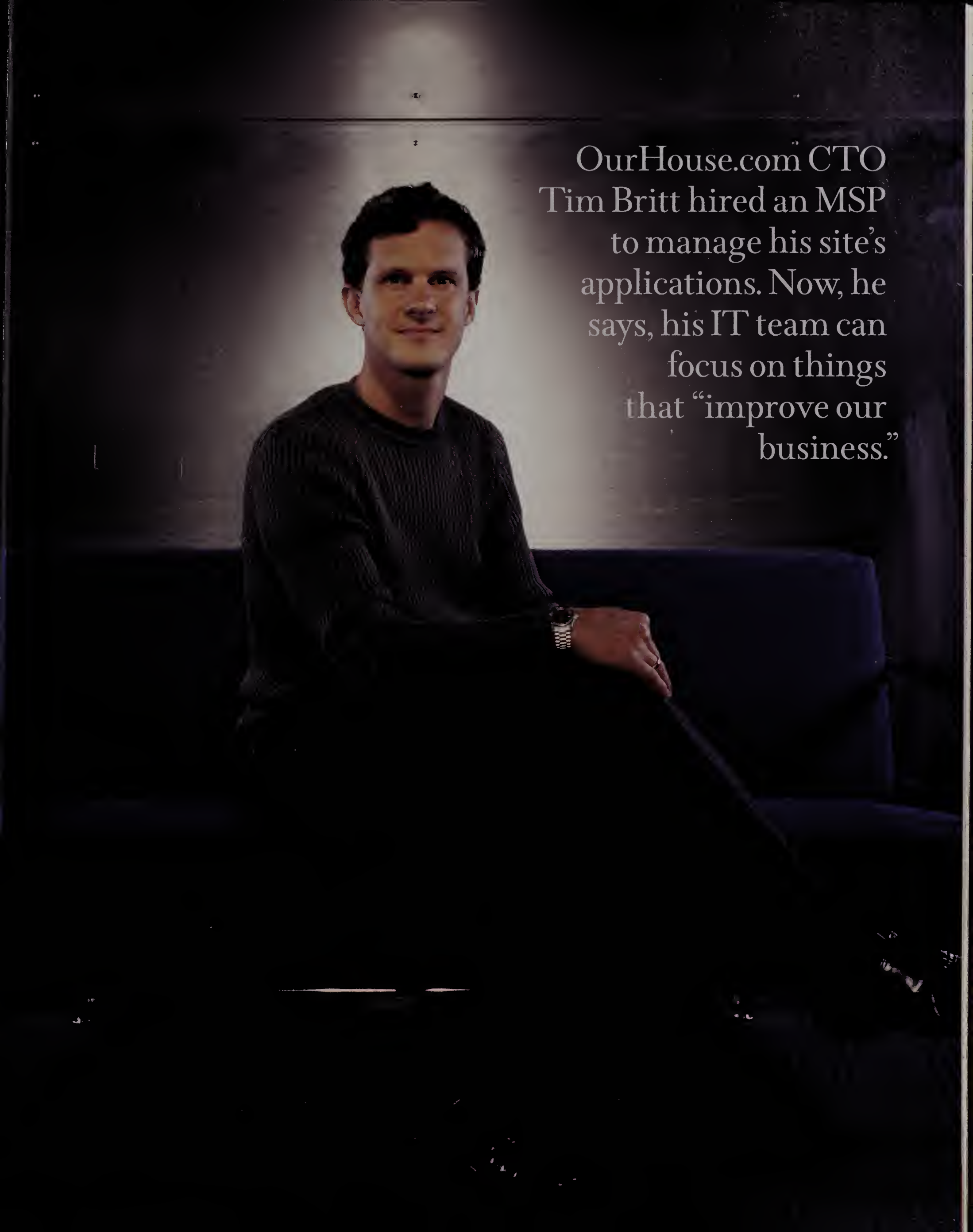
A MANAGEMENT SERVICE PROVIDER (MSP) IS a vendor that remotely manages and monitors enterprise applications—anything from ERP, CRM or firewalls to proprietary e-business applications—or network infrastructure. These vendors make their money by charging businesses on a subscription basis—per device, servers, PCs and so on.

MSPs claim to be an improvement over the ASP model because they permit companies to outsource the maintenance of their applications—making sure they're up and running, providing fixes when they're not—without outsourcing the applications themselves, thus providing a relatively cheap, easy and unobtrusive way for a company to prevent outages and malfunctions. Meanwhile, because MSPs provide 24/7 monitoring, companies don't have to worry about staffing up to handle that nonrevenue-producing task. And if the MSP suddenly shuts its doors, as has happened all too often in the ASP world (and

Reader ROI

- ▶ See how management service providers developed
- ▶ Determine if MSPs are right for you
- ▶ Read tips on working with an MSP

PHOTO BY JEFF SCIORTINO

A man with dark hair, wearing a dark sweater, is sitting on a dark blue couch. He is looking towards the camera with a slight smile. The background is a plain, light-colored wall. The lighting is soft, coming from the front and slightly to the side.

OurHouse.com[®] CTO
Tim Britt hired an MSP
to manage his site's
applications. Now, he
says, his IT team can
focus on things
that "improve our
business."

recently in the MSP world too), the business can continue because it still has its applications.

"MSPs are a little easier to stomach [than ASPs]," says Corey Ferengul, an analyst who covers IT services outsourcing for Meta Group in Stamford, Conn. "You can tell yourself, 'Oh, I'm just having someone monitor my applications.' That's not nearly as intrusive to an organization as having someone take over your applications."

That sounds good, but if you're thinking about using an MSP to take some of the load off IT, you should be aware of some potential problems.

First, many MSPs are no more stable than the ASPs were (see "Boy, That Was Fast," Nov. 15, 2000), and that's saying something. According to Giga Information Group ASP Analyst David Friedlander, a year ago there were an estimated 300 ASPs. Today, about 50 of them have gone out of business and another 100 have changed their business models so radically that they can no longer be considered ASPs. By comparison, there are an estimated 200-odd MSPs right now, and according to Ferengul there are simply not enough customers to keep them all afloat. In fact, several—including i-Sharp,

ManageIT and Intira—have already folded.

Also, not all MSPs are alike. Some aren't as scalable as others, which at a critical time might leave a company waiting in line for service as the MSP takes on new customers. And certain MSPs are limited in the platforms they support, which means that if a shop runs a variety of platforms and technologies, it may have to contract with a number of MSPs to meet its various needs.

Finally, the MSP market is in its very early stages, which means that pricing could be unstable during the next year or two as the market matures.

But all this shouldn't necessarily stop you from considering the MSP option, especially given the current economy. As Stan Schatt, a vice president in charge of the networking and communications group at Cambridge, Mass.-based Giga Information Group, points out, a lot of companies are in hiring

freezes right now. In this climate, outsourcing IT monitoring and management can be a good solution, at least for the short term.

Voices of Experience

The MSP name describes several kinds of players, including pure play—what analysts call the most basic MSP model. It manages and monitors its customers' applications and networks, and that's all.

Other types of MSPs include Santa Clara, Calif.-based Exodus and Beltsville, Md.-based Digex, both large colocation and hosting companies. As opposed to pure plays, which offer monitoring as their core product, companies such as Exodus and Digex specialize in providing the space and hardware needed to physically house and power infrastructures—offering monitoring and management as a secondary product.

Management service providers offering those types of services have been facing falling revenues because of the dotcom crash and the consequent softening of the colocation and hosting markets, and are adding management services such as application and network monitoring to try to expand their businesses. Some of these companies don't have in-house MSP expertise; instead they're partnering with pure plays, such as Rancho Santa Margarita, Calif.-based SiteLite and Chantilly, Va.-based SevenSpace, and rebranding these services to their customers as add-ons to what they already provide. Meanwhile, some MSPs—such as San Francisco-based Totality and Bedford, Mass.-based InteQ—are closer to pure plays, but they can also rent infrastructures such as servers, networks and hosting services.

But all management service providers, no matter what their model, make the same sales pitch: They can do a critical job better

The Inevitability of the MSP

As hardware and software costs go down, the cost of people and time go up

THE EMERGENCE OF MSPs is a predictable macroeconomic development, says Kraft Foods Senior Vice President and CIO Steve Finnerty, a 30-year IT veteran. Companies outsource whatever is most costly to them at the time.

In the 1970s, Finnerty relates, hardware was expensive. So companies engaged in hardware time-share agreements, a precursor to outsourcing.

By the 1990s, software had become a huge cost center. Hence the rise of ASPs.

Now, it's people that are costly. Companies can't afford to maintain huge IT staffs, which is where MSPs come in, replacing the people you'd need to watch every server, router and box around the clock, making sure your applications or network don't go down.

"To me the [outsourcing] pendulum is following economics," Finnerty says. "That's the historical perspective I see. Moving from hardware to software to the people aspect of managing business processes."

—E.B.



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and more cheaply than you can. Totality customer Tim Britt, CTO of OurHouse.com in Evanston, Ill., ACE Hardware's exclusive Internet distribution channel, seconds that notion. Until last April, Britt managed and monitored the company's applications in-house. "In order for things to work smoothly, we needed people to be on call 24 hours a day," Britt says, pointing out that one experienced database administrator was getting called about three nights a week to deal with outages.

Now that Totality monitors and manages the site's applications, Britt says the night calls have ceased. "Now [our internal IT

staff] can focus on things that enable development of new features and allow us to improve our business."

Management service providers claim that their monitoring tools enable them to detect potential outages long before an internal IT staff could. OurHouse.com, for example, gets a nightly feed from ACE with the SKU numbers of all the ACE products that OurHouse.com is supposed to put up on the site—usually about 30,000 items. The feed contains information about new products and which items are out of stock.

Before Totality began monitoring OurHouse.com, the site failed to accept the feed

at least once a week, and Britt wouldn't know about it until the next morning. This caused huge difficulties. If 100 people ordered a hammer that should have been listed as out of stock, for example, the company would have to call 100 annoyed customers. Now Totality sees that a feed didn't come through, takes a prescribed set of actions and in most cases gets the process to work without Britt getting involved. "The fact that they can catch it and deal with it before customers place a bunch of orders probably saves us a good 10 hours of dealing with customer-service problems," says Britt.

Rich Guetzloff, senior director of IT oper-

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ations at R.R. Donnelly & Sons, a \$5 billion Chicago-based printing company, uses MSP Rolling Meadows, Ill.-based Telenisus to monitor his Checkpoint firewall. Before signing on with Telenisus a year ago, Donnelly experienced regular outages, including one that lasted for more than 24 hours. But since Telenisus began monitoring, Donnelly's longest outage has been four hours. "It would take us at least twice as long as them to figure things out each time," Guetzloff says. "And I had one guy doing the job. And if he was on vacation, we'd be struggling with the second-most know-

ledgeable guy trying to figure things out."

Despite these positive reviews, most customers who spoke with *CIO* are more comfortable having MSPs manage their networks, not their applications. Craig Allen, CIO of Meritage, an \$800 million manufacturing-services company in Santa Fe Springs, Calif., uses NetSolve to manage a WAN that connects all 29 companies under Meritage's umbrella. He says the Austin, Texas-based NetSolve has been great at detecting and addressing network outages, but that's as far as he wants to go at this point. Allen feels that applications simply cut too close to the

company's core competencies, and no MSP can understand his business well enough to handle them. "MSPs are fine for networks, but applications are living," he says. "They change to fit our environment, and we modify them on a day-to-day basis. And the more difficult the application, the tougher it becomes to outsource."

There are other troubling issues with MSPs. Several pure plays—such as I-Sharp (R.I.P. spring 2001) and ManageIT (also R.I.P. spring 2001)—have already gone out of business. This instability in the MSP space contributes to unstable pricing; the monthly per-server cost of MSP services can fluctuate anywhere from 50 bucks to several hundred dollars a month without any real logic, says Giga's Schatt. Plus, if it's your MSP that goes bust, get ready for headaches.

David Cooper, director of field information services and technology for Wickes, a \$1 billion Vernon Hills, Ill.-based lumber and building supply retailer, was using Comdisco, an equipment-leasing company that offered MSP services, to monitor the AT&T frame-relay network that connects Wickes' 115 stores. When Comdisco announced this spring that it was leaving the MSP space (the company subsequently filed for Chapter 11 in July), it gave Cooper about 90 days to find a replacement before it pulled the plug on its monitoring services. And it took Cooper the whole 90 days to research all potential partners. He eventually settled on NetSolve but found the entire experience upsetting. "It's kind of like getting married and before the honeymoon is over, your spouse says, 'Go find someone else.'"

Nevertheless, Cooper plans to stick with MSPs. Considering the money he's *not* spending on staffing for monitoring, plus the money he's generating by having his staff focus on revenue-generating activities like applications development, he estimates that Wickes is saving \$10,000 a month by going with an MSP.

Of course, not all MSPs provide the top-flight service Britt and Guetzloff report. Larry Anderson, director of IS operations and technology for Cost Plus World Market,

Before signing
on with an MSP,
GFI.net CIO
Russ Lewis
wants to know
how it plans
to help him
transition to
another
provider,
should the
first MSP
go under.

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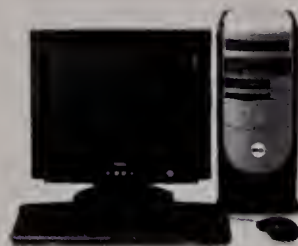
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a specialty retailer in Oakland, Calif., was also using Comdisco to manage his WAN—a frame-relay network connecting approximately 150 retail stores, corporate headquarters and a main distribution center. He says his own IT people would detect problems before his MSP did.

“We’d notice that a circuit wouldn’t be connecting to a particular store, and we’d check the Comdisco logs and see that they hadn’t noticed the problem,” Anderson recalls. “They’d only notice when we contacted them. Obviously, that defeats the purpose of having an MSP.”

How to Make an MSP Work for You

Anytime you’re dealing with a market as new as the MSP, it’s difficult to be sure about what service you’ll end up getting. To protect yourself, there are certain things you should do when vetting candidates.

■ **NEGOTIATE AN EXIT STRATEGY.** If your MSP goes bust, it can be a headache to find a replacement because you’re not only losing time and labor, you’re losing people who know your network and your apps. Those can’t be replaced; they have to be rebuilt.

If your MSP goes bust, you’re not only losing time and labor, you’re losing people who know your network and your apps.

“You have people familiar with the care, feeding and idiosyncrasies of your applications and how to fix them,” says Russ Lewis, executive vice president and CIO of GFInet, the online arm of New York City-based financial services company GFI. Lewis is concerned about avoiding that particular pain. Lewis uses White Plains, N.Y.-based Metromedia Fiber Network (MFN) to manage his ERP system and Web applications. He says employing MFN saves his company

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\$1.6 million a year. The worst-case scenario, he says, occurs if the MSP is also providing hosting or colocation services—as it does for GFInet. In that case, “[the MSP people] shut their doors, you can’t get at your hardware, and your customers are connected to them via their network,” he says. “You’d have to reroute your traffic, take out your applications, put them on new hardware, and get it all up and running.”

Consequently, when Lewis evaluates an MSP, he’s as interested in how it will transition his company *away* from its services as *to* its services. He looks to see that the MSP will document the services it has performed so that he has something to give either the new MSP or people he has assigned internally to monitor his apps. Lewis also wants to be sure that it keeps a full inventory of hardware and routers so that those successors know what they’re working with. And to help move his business to a new MSP, he demands an articulated process with pro-

those companies’ monitoring, they can certainly handle his. “I especially look for telecommunications companies because telecom is highly regulated and [they] can face penalties” from the FCC for failing to provide certain levels of service, he says.

But Dennis Upton, CIO of business-equipment manufacturer Brother International in Bridgewater, N.J., looks for recommendations from midsize customers, where the MSP is likely to be the sole provider of services. Upton, who uses Alpharetta, Ga.-based SeventhWave Technology to monitor his SAP system, believes that a recommendation from a customer dependent on the MSP is more significant than one from “the GMs and the Citibanks; they probably have 50 firms working there in one way or another.”

■ LOOK FOR STANDARDIZED PROCESSES.

A lot of MSPs are very new and immature, and you want to make sure they’ve really established how they operate, says Meta Group’s Ferengul. For example, if you ask what they do for server maintenance or what they do when you need a patch applied, and they respond, “What do you want us to do?” it means they don’t have standard operating processes and you can’t be sure what you’ll get out of them. Giga’s Schatt adds that these processes should be automated. Without automation, the MSP won’t be able to scale up and your company will be doomed to service problems down the road as the MSP takes on more and more customers.

■ **SIGN ON SHORT TERM.** MSPs bill at a per-device fee on a monthly basis, and service contracts are generally for one, two or three years. But given the volatility of the MSP space, it’s wise to get the shortest contract you can, says Schatt. He adds that MSPs will likely not agree to contracts shorter than one year, as it takes them almost that long to recoup their setup costs.

■ **SHOP AROUND.** As prices vary widely from MSP to MSP, it’s quite possible to play them off against each other to get yourself the best deal possible.

visions for a gap analysis—in which the MSP examines the differences between its own monitoring tools and those of its successor.

■ **GET REFERENCES.** There’s no better indicator of how an MSP will handle your business than how it handles others’. But different customers have different views on what to look for. Guetzloff of R.R. Donnelly looks for big Fortune 500 customers because, he figures, if the MSP can handle

Wireless is calling.



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Looking Ahead

Observers of the MSP space predict a huge shakeout during the next year—a shakeout that's already begun as Comdisco and others have fallen by the wayside.

Ferengul points out that right now MSPs are servicing only about 3 percent to 5 percent of their potential marketplace. At the same time, more than 200 vendors are trying to establish themselves. This means that a lot of management service providers are going to go out of business in the near future, and analysts predict that the pure plays—which just monitor applications and networks—are likely to be the first to go. Those that survive will be the ones that form alliances with huge colocators or hosting companies, such as Digex, Exodus and Verio, rebrand the MSP services and sell them as their own. Meanwhile, traditional outsourcers such as Accenture and Perot

Ultimately, MSPs will be seeking midsize customers because larger companies have the resources to handle their monitoring and management in-house.

Systems appear to be making a move toward the same market, offering MSP-type services in an MSP manner, says Schatt.

Ultimately, management service providers will be seeking midsize customers as their target base because larger companies have the resources to handle their monitoring and management in-house, Schatt says. And traditional outsourcers, such as Accenture, CSC, IBM Global Services and Perot Systems, that want to take advantage of the MSP market will have to devise a new busi-

ness model that's more friendly to midmarket enterprise.

So what does all this mean to the user? It means a lot of pricing instability in the future. So go on and consider the MSP—it can save you a lot of money.

But keep the Dramamine handy. The coming year promises a bumpy ride. **CIO**

Do you have any experience working with MSPs? Share your stories with Senior Writer Eric Berkman at berkman@cio.com.

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Case Files: Marconi

CUSTOMER FOCUS

► KNOWLEDGE MANAGEMENT ◀

PROJECT MANAGEMENT

VALUE PROPOSITION

COMPANY INFO

COMPANY

Marconi, a London-based global telecommunications provider

HEADQUARTERS

Warrendale, Pa.

REVENUES

\$4.5 billion

EMPLOYEES

45,000 worldwide

URL

www.marconi.com

KM PROBLEM

How can a company create a knowledge management system that ensures its technical support agents have the latest, most accurate product information for troubleshooting customers' problems?

THE PLAYERS

DAVE BREIT

Director of Technology and R&D for Managed Services

ZEHRA DEMIRAL

Manager of Knowledge Management Systems

CASE ANALYST

TOM DAVENPORT

Director of the Accenture Institute for Strategic Change

Know-It-Alls

To streamline customer service, Marconi employed a system to facilitate tech support knowledge sharing. In the process, the roles of tech agents changed. **BY LOUISE FICKEL**

WHEN MARCONI WENT on a shopping spree and acquired 10 telecommunications companies over a three-year period, it faced a serious challenge: How could the \$3 billion manufacturer of telecommunications equipment ensure that its technical support agents knew enough about newly acquired technology to provide quick and accurate answers to customers on the phone? And how could Marconi bring new agents up to speed on all the company's products?

Marconi's technical support agents—500 engineers scattered in 14 call centers around the globe—field approximately 10,000 questions every month about the company's products. Before the acquisitions, agents had relied on Tactics Online, an extranet where they and customers could search for frequently asked questions and text documents. As new agents and products joined the company's ranks, Marconi wanted to supplement the website with a more comprehensive knowledge management system.

As engineers from the newly acquired companies came on board, however, they were hesitant to share their knowledge about the products they had been supporting. "They felt that their knowledge was a security blanket that helped guarantee their jobs," says Dave Breit, director of technology and R&D for managed services in Warrendale, Pa. "With all of the acquisitions, it was essential that we all avoid hoarding knowledge and share it instead."

At the same time, Marconi wanted to streamline its customer service organization by making more of its product and systems information available directly to customers and shortening the length of customer calls. "We wanted to leverage the Web for customer self-service versus increasing the number of agents," Breit says. "We also wanted to provide our frontline engineers [who interact directly with customers] with more information more quickly so that they could resolve more calls faster."

PHOTO BY MARK BOLSTER



Building on a KM Foundation

When Marconi began evaluating knowledge management technologies in the spring of 1998, the concept of sharing knowledge among agents was nothing new. Agents were already accustomed to working in teams of three or four people, gathering in war room fashion to solve customers' technical issues. And a year earlier, Marconi had started basing a percentage of agents' quarterly bonuses

on the amount of knowledge they submitted to Tactics Online as well as their involvement with mentoring and training other agents. "Each agent was expected to teach two training classes and write 10 FAQs to earn their full bonus," says Breit. "When we brought new companies online, the new agents received the same bonus plan. This approach allowed us to build a very open knowledge-sharing environment."

For Dave Breit, Marconi's director of technology and R&D for managed services, a successful KM system is fully integrated into daily operations.

To augment Tactics Online, Marconi chose software from ServiceWare Technologies, in part because its technology would integrate easily with the company's Remedy CRM system, which agents use to log incoming calls from customers and track other customer interactions. In addition, says Breit, Marconi wanted its agents to populate its existing Oracle database of product information.

Breit's division spent six months implementing the new system and training agents. The system—dubbed KnowledgeBase—is linked to the company's CRM system and is powered by the Oracle database. The integrated view of Marconi's customers and products provides agents with a comprehensive history of interactions. Technical support agents can, for example, put markers in the database and immediately pick up at the point where the customer last spoke with another agent.

On the Front Line

Tactics Online complements the new system. "The data stored in KnowledgeBase are specific troubleshooting tips and hints on our various product lines," says Zehra Demiral, manager of knowledge management systems. "Tactics Online, on the other hand, is more of a doorway for customers to come into our customer support organization. From there, customers can access KnowledgeBase or their service requests or our online training manuals."

Technical support agents now rely on KnowledgeBase for the latest solutions to customers' product and systems problems. Level 1 agents answer all incoming calls, solve customers' problems when possible,

record the calls in the company's CRM system and transfer the more difficult calls up the line to Level 2 agents. Level 2 agents, meanwhile, are the heart of the organization, composing about 70 percent of the technical support organization. They handle the more difficult calls and troubleshoot and diagnose equipment and network problems. "They're the majority of our knowledge users and contributors," says Breit. "They write up a synopsis of the call and feed it into KnowledgeBase [on an ongoing basis] so that other agents can refer to the solution later."

After Level 2 agents submit their knowledge "raw" to a holding queue, Level 3 agents confirm the accuracy of the information, make any necessary changes and then submit the document to Demiral. (Level 3 agents also act as consultants, helping Level 2 agents solve problems and serving as intermediaries between the agents and the company's engineering departments.) The entire process of updating the KnowledgeBase system with a new solution typically takes between three days and two weeks.

Changing Roles

As Breit anticipated, implementing KnowledgeBase has changed the agents' roles. Level 1 agents, for example, now do more in-depth troubleshooting because they have more information available at their fingertips. In fact, they solve twice as many calls themselves (50 percent instead of 25 percent) in a shorter time (10 minutes versus 30 minutes). Since Level 1 agents can handle more calls, this group has doubled in size during the past two years.

The transition wasn't quite as painless, however, for the Level 2 and Level 3 agents. Indeed, their roles changed significantly. "Rather than simply submitting HTML pages to Tactics Online, they were now asked to analyze the problems in a very procedural way and create diagnostic 'trees,'" says Breit. "That's a more analytical way to think through a problem. Most of these guys had thought in terms of 'what is the fastest way to solve a problem' rather than 'what

is the most efficient way to solve a problem.'"

With hundreds of people submitting solutions, Marconi tended to get a lot of wheel reinvention. "There can be five or six ways to solve the [same] problem, but there's one way that's most efficient," Breit says. To unearth and disseminate the most efficient

solutions, agents were required to flowchart each of their solutions for the first three months following KnowledgeBase's launch. "It's amazing how many [agents] were unconscious of their own methodologies," says Breit. "It was somewhat painful, but they eventually felt they benefited because

EXPERT ANALYSIS

ON THE RIGHT TRACK

BY TOM DAVENPORT

IF THERE'S A NO-BRAINER IDEA within the realm of knowledge management, it's to focus on customer service. You want business value? It's available in spades, with the prospect of more customer inquiries served with substantially fewer humans. Seeking engaged users? There's no more knowledge-hungry employee than a service rep with a customer on the line and a perplexing problem. The Marconi situation described in this case is a great illustration of the logic behind applying knowledge management to the service process.

It's also a great picture of some of the difficulties involved. If you're compiling an internal repository of best practices or lessons learned, you can assemble it in a slapdash fashion, and few will be the wiser. But a knowledge repository for customer service is the knowledge equivalent of an online-transaction processing system. Service representatives have to find the right piece of knowledge in real-time, while the customer waits. Asking the customer to hold while you browse 3,462 documents in a typical intranet search won't do. The key to success with these systems is a good architecture and strong content-management discipline. These factors are even more critical when a company allows customers direct access to parts of the system, as Marconi does.

Marconi appears to have the necessary processes in place. The company realizes, for example, that you have to structure the knowledge in a way that may be harder to put in but much easier to get out (for example, in the form of a decision tree, where answering a few questions quickly gets you to the right answer). A lot of companies blanch at the effort required to build such a knowledge base, but Marconi appears to be biting the bullet. The company has also realized that maintaining the knowledge base in a high-quality form requires much care. It's not allowing just anyone to add redundant (or even incorrect) knowledge to the system—you've got to be a Level 3 expert to add a new solution. Building and maintaining the customer service knowledge repository are not democratic processes.

Marconi has also done the right thing in terms of rewarding its people. With both monetary and symbolic rewards, it's changed the culture around knowledge from hoarding to sharing. Not surprisingly, things are going well for both the individuals who share and for Marconi in general. Virtue isn't always rewarded to this degree.



Tom Davenport is director of the Accenture Institute for Strategic Change and professor of information management at Boston University. He can be reached at davenport@cio.com.

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they understood how they solve problems.”

As a result, agents now create technical solutions for customers in the most efficient—and logical—way possible instead of simply offering a “quick and dirty” solution. Think of the difference between simply being told what keys to strike on your PC and being taught how your software works and the logic behind executing a certain sequence of keystrokes. Once you actually understand how the product works, you can use the software more effectively and resolve more problems yourself.

terms of the product and then the problem. But engineers often think about the problem first and then the product.”

The result: Customers often wouldn’t fully understand the solution. At the same time, Marconi had to work at easing Level 3 agents’ concerns that making them responsible for reviewing solution content would suddenly turn them into technical writers.

Marconi confronted cultural issues as well. “Business needs are different in different parts of the world,” says Demiral. “What may be normal business practice for

“We wanted to provide a collaboration tool for employees and a library source for our customers.”

—ZEHRA DEMIRAL, MANAGER OF KNOWLEDGE MANAGEMENT SYSTEMS

Agents also had to change the way they present the solutions to customers. “We wanted to provide a collaboration tool for employees *and* a library source for our customers,” says Demiral. “Engineers wanted to provide a lot of detailed information yet we needed a degree of simplicity for customers. Most of the time, the immediate focus is on what a great collaboration tool this is and how it overcomes geographical distance among agents. Then I have to remind [agents] that this is a tool that we want customers to use and that they’ll have to organize, write and present the content with customers in mind.”

Making It Work

Demiral spent a lot of time working with the Level 3 agents to make their solutions less complex and streamline the review process. “We had to go through two iterations of how to organize and present the content,” Demiral says. “Customers tend to think in

Americans may not be common elsewhere.” In Europe, for example, the value of the KnowledgeBase system was not readily accepted. But once employees there saw that customers could use the system to solve some of their own problems, they got on board. Such an experience has been incorporated into how Marconi approaches KM. “We sometimes have to introduce the idea of knowledge management over time, validate it, and then move forward,” Demiral says.

To ensure that agents continue contributing new knowledge to KnowledgeBase, Marconi uses rewards. Besides bonuses, knowledge contributors receive recognition during meetings and in a newsletter. “Rewards help feed this culture,” Breit says. “Peer pressure also plays a role. Everyone wants to contribute because it’s the right thing to do. You also have to make sure that the system works well and that employees use it long enough to see it work. It has to be embedded in training and fully integrated into daily operations so that it just becomes part of how you do business.” **CIO**

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Send any KM case studies to Senior Editor Megan Santosus at santosus@cio.com. Louise Fickel is a freelance writer based in Frederick, Md.

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EASTER IN NOVEMBER CHRISTMAS IN JULY

If your company has seasonal sales spikes and dips (and what company doesn't?), your supply chain needs to be supple enough to accommodate them. Here's how it's done.

BY SIMONE KAPLAN



EVERY YEAR AROUND LABOR DAY, JUST BORN, maker of those gooey pink and yellow marshmallow chicks called Peeps, begins to get ready for its big Easter season. It turns to its sales forecasts, and it purchases mass quantities of sugar, food coloring and packaging to meet the anticipated demand. And every year it gets stuck with leftover Peeps and unused materials that cost it sacks of money.

Just Born manufactures 600 million Peeps a year, 80 percent of which are sold during the Easter season. The 78-year-old, almost \$100 million Bethlehem, Pa.-based company also makes Peeps for Valentine's Day, Christmas and Halloween, but Easter is make-or-break time.

Just Born depends heavily on monthly sales forecasts based on historical data, much of which is gathered from sales representatives who have to wrangle that information from independent candy brokers, whose interests do not always parallel Just Born's. The data Just Born does manage to retrieve is therefore, to use Just Born Supply Chain Director Don Petraitis's word, "problematic."

Reader ROI

- ▶ Strategies for predicting surges in demand
- ▶ Techniques for managing temporary staff
- ▶ Outsourcing guides



**Proflowers.com VP
Mark Sottosanti: "If we
see that a flower's on
track to be sold out,
we'll bump up the price
to suppress demand."**

"[Our forecasts] always change as it gets closer to the season," Petraitis says. "Either we're caught short and can't respond to demand in time, or we don't sell enough and are left with overstock."

Petraitis, a 10-year operations veteran with Just Born who admits he had "no formal training or experience" in dealing with the supply chain operations before he was

put in charge last June, has already figured out that forecasting software isn't the answer to the company's problems. The IT department had tried using Excel spreadsheets, then a forecasting software package from Demand Solutions, but the more sophisticated application did not lead to just-in-time Peeps. It was the quality of the information that mattered, not the software.

Now Just Born hopes to link with its suppliers through the Web in a fully automated supply chain, although Petraitis says that's down the road a ways.

The good news for Just Born is that at least it's thinking about supply chain management.

The bad news is that it took them so long to do it.

Ramping Up and Winding Down

LOTS OF BUSINESSES, FROM fulfillment and delivery to clothing manufacturers, lawn and gardening suppliers, and oil companies have to deal with surges in demand that occur predictably around the winter holidays or the onset of hot weather. Supply chain management is relatively easy when it's handling steady state demands; the real test comes with handling huge seasonal fluctuations.

"If a big part of your revenue comes from activity that goes on in a seasonal period and you don't build to support it, you are out of business," says Herb Kleinberger, leader of the global retail practice at New York City-based PricewaterhouseCoopers. "You're toast."

Case in point: Computer City, the chain

launched by RadioShack in the mid-1990s. Designed to compete with stores like CompUSA and Circuit City, it failed after four years because it didn't know how to manage its inventory, says Chapman Kistler, vice president of the supply chain service line at Cap Gemini Ernst & Young, a global management consultancy based in New York City.

"RadioShack's core competency was in stocking one of everything," Kistler says. But when Christmas came, having one of everything didn't help Computer City cope with a run on new ink-jet printers.

Just Born's Peeps problem is a classic example of poor supply chain management.

"Everyone is guessing along the supply chain as to how much to make and ship," says Kleinberger. "And they're all guessing in separate ways from each other, so everyone builds in extra safety stock to buffer forecasting errors. You add it up along the chain, and you end up with a huge cork that's clogged with excess capacity."

Or, in this case, pink and yellow Peeps.

The cost of sitting on excess product varies by category and industry, but it can be as much as 10 percent to 25 percent of distribution costs, according to Kevin O'Marah, the service director of supply chain strategies at Boston-based AMR Research. Transporting, insuring and storing extra capacity can increase overall costs by 10 percent or 11 percent, particularly during peak times, O'Marah says.

Planning ahead to predict demand, staffing appropriately to handle spikes, knowing how to make the tough purchasing and warehousing decisions, and ensuring the proper collection of data for forecasting are all components of supply chain excellence vital for companies that experience seasonal fluctuations. Even if you don't do most of your business around

various holidays, chances are you have to deal with seasonal fluctuations of one kind or another. "Very few companies have no seasonal peaks," Kistler says. Or, for that matter, dips.

(Industries that typically don't experience seasonal surges include pharmaceuticals, fast-food restaurants and B2B distributors in the aerospace sector.)

If you haven't already started thinking about managing your supply chain operations to deal with spikes, you're late, but maybe you're not yet toast. Here are three steps to help you build a flexible supply chain that can handle those scary seasonal ups and downs.

Dynamic Databases or How to Store 360 Million Pizzas

ON A NORMAL SUNDAY, DOMINO'S Pizza sells about 750,000 pies. But on Super Bowl Sunday, it sells 1.1 million, a 46 percent spike, says CIO Tim Monteith.

Domino's business also spikes on weekends and whenever the weather gets nasty. There seems to be something about rain, sleet and snow that makes Americans simultaneously hungry and too lazy to do anything about it other than picking up the phone. To stay on top of demand, Monteith relies on his data warehouse to keep his business running.

Ann Arbor, Mich.-based Domino's has 4,850 stores nationwide, and each store sells about 1,000 pizzas per week. In 2000, Domino's made 270 million pounds of dough and used 146 million pounds of cheese, 13 million pounds of Italian sausage and 9.9 million pounds of mushrooms to make more than 360 million pizzas. The demand for materials goes through the roof in the days prior to major spikes, Monteith says.

"To handle peaks, you must have the

JUST BORN

Peeps sold during the Easter season:

480 million

Peeps sold during the rest of the year:

120 million



Domino's Pizza CIO Tim Monteith:
"Data aggregation and analysis are where the CIO can provide the most value."

DOMINO'S PIZZA

Pizzas sold on Super Bowl Sunday:

1.1 million

On an average Sunday:

750,000



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right tools," he says. "You must have a good database to learn what causes spikes and how to predict them."

Because each store can experience wild fluctuations depending on local conditions, Domino's database keeps historical data on sales at all 4,850 stores. Computers at each store automatically tabulate the amount and nature of supplies used each day, which allows the store managers to know exactly how much needs to be ordered and what is in danger of going bad.

"The inventory is dynamically adjusted," Monteith says. "If [a customer orders] a pepperoni pizza, the computer will deduct one roll of dough, 5 ounces of cheese, and a unit of sauce and pepperoni from the system."

Monteith ties the data gathered from the automated ordering system tightly to sales forecasts, and that provides him with a daily history that is useful when planning for the next Super Bowl Sunday or even just the next rainy Sunday. He uses Manugistics Group software (see "Crystal Ball Technology," Page 104) to manage Domino's warehouse and distribution system. To further organize the data from each store, Domino's is rolling out an ordering and forecasting system by Breakaway International Systems that will be up and running in U.S.

stores by 2003. The new system includes software by Intellisol International that will help the stores forecast their staffing needs depending on sales levels.

"Data aggregation and trend analysis are where the CIO and IT organization can provide the most value," says Bob Moncrieff, a director at PRTM, a global management consultancy based in Waltham, Mass. In creating a supply chain, "the most important step to take is creating a well-structured data warehouse in which you can store, format, and manipulate supply and demand data," says Moncrieff. "This will help you see seasonal issues very quickly."

Integrated Channels or You Can't Wait Until the Bloom Is Off the Rose

PROFLOWERS.COM, AN ONLINE flower dealer, does 40 percent of its annual business on just two dates: Valentine's Day and Mother's Day. It also sees a surge, though less dramatic, in

demand around Christmas, Thanksgiving and Easter.

During Mother's Day week, the San

Diego-based company ships about 250,000 flowers and plants, as opposed to 12,000 in a nonpeak week, says Mark Sottosanti, vice president of planning and logistics.

Unlike clothes and computers, or (to a certain extent) pepperoni and Peeps, flowers are *very* perishable. They must be grown months in

advance of when they will be needed, and they begin dying the moment they're cut. Most flowers can live a maximum of 10 days once cut, Sottosanti says.

"It's crucial from a product and a business standpoint that we know what our growers have and what sales for our spikes will be," he says.

In order to work within those 10 days, the company uses a proprietary Web-based system to link its independent growers to its network. Unlike online flower sellers FTD or 1-800-Flowers, which route orders through a network of growers, wholesalers and florists, Proflowers.com ships its flowers directly from the growers. When a customer

PROFLOWERS.COM

Plants and flowers sold
Mother's Day week:

250,000

In an
average week:

12,000

Getting There Is *All* the Fun

How UPS ramps up to take care of everyone

FOR MOST COMPANIES, getting packages to customers is vital to the business. When you're United Parcel Service, getting the package to the customer is your business.

Between Thanksgiving and Christmas 2000, UPS delivered more than 325 million packages, 19 million of which were delivered on Dec. 19. That's compared with the average nonholiday season daily package volume of 13.6 million. To handle the Christmas spike, UPS starts planning immediately after the previous holiday season ends. Around Thanksgiving, the Atlanta-based company hires 90,000 temporary workers and adds more than 20 jets to its fleet of 600 planes. It relies on historical data, and it works closely with "high-impact shippers" like specialty fruit purveyor Harry & David.

"We don't like to plan on the fly," says Randy Blaisdell, air group peak planning manager for UPS. "We really work on communica-

tion with the high-impact shippers. We like to have it all planned out in advance, preferably as soon as they have their forecasts together."

Blaisdell oversees a group of 18 people who plan for the holiday season year-round. His team works to integrate UPS's air hubs and ground hubs so that no one sorting center gets overloaded. For example, if there's a high-impact shipper in Memphis, Tenn., generating four or five truckloads of packages a day, the peak planning team will make sure the package volume is distributed between centers in and around the city.

So if you're planning on shipping an extra 20,000 packages during a seasonal peak, it's a good idea to talk with your carrier. Then, both they and you can get shipments to your customers on time.

-S.K.

UPS

Packages delivered
on Dec. 19:

19 million

On an average day:

13.6 million

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Supply Chain Management

places an order on the website, it is stored in the system and automatically routed to a grower a day or two before it is scheduled to be filled. So if a customer orders a dozen roses on Jan. 15 to be delivered on Feb. 14, Valentine's Day, the grower will not see the order until Feb. 12 or 13. The order will be shipped the next day via refrigerated truck to a FedEx ramp and then flown to its destination. Because the growers give daily inventory updates, the company always knows how many of each type of flower it has to work with.

If the worst happens and the growers run out of roses on Valentine's Day, the website will stop taking orders for roses.

Proflowers.com monitors the inventory data and orders so that "if we see that a flower is on track to be sold out, we'll bump up the price to suppress demand," Sottosanti says. And the system will not take orders for products that are not in stock.

If there's excess inventory sitting around after a spike, the company will offer a free vase or a discounted price to try to move it. One time, Sottosanti says, a misjudgment in forecasting led to a surplus of 20,000 tulips after Easter. The company donated them to a local festival. Only about 1 percent of the flowers ordered annually have to be thrown away, he says.

When Proflowers.com needs to ramp up for seasonal peaks, Sottosanti outsources his extra call center and e-mail needs to third-party contractors for two- to three-week periods. When the peak ends, so does the contract.

Creative Staffing or It Takes a Village to Sell That Much Fruitcake

HARRY & DAVID, THE CATALOG giant that sells fancy fruits, candy, preserves and fruitcake, normally gets by with 300 employees in its two call centers. But every year beginning in September, the company begins to ramp up for Christmas by hiring 3,000 seasonal



Yamanouchi Consumer (Harry & David) CIO Rod McLeod: "To handle a peak, you must pay attention to the way you staff up."

employees and opening a third call center.

Talk about being prepared; Harry & David puts the Boy Scouts to shame.

During the Christmas season, Harry & David, which is owned by Medford, Ore.-based Bear Creek Corp., processes about 75,000 orders and ships more than 250,000 packages a day, as opposed to 500 orders and 18,000 packages a day in the off-season. So the temporary staff has to be comfortable with the job at hand, says Rod McLeod, CIO of Yamanouchi Consumer, the parent company of Bear Creek.

The company has two permanent distribution and call centers—in Medford, Ore., and Hopewell, Ohio. To handle the seasonal surge, it leases space and equipment for a third, temporary center in Eugene, Ore., which typically holds 500 workstations that are staffed during peak hours from the day after Thanksgiving to Jan. 15. The lease is multi-year, though the space goes unused the rest of the year. Temporary staff starts a rigid training program in October, months before the peak season kicks into gear. The program costs a lot, McLeod says, but he believes it's a necessary expense, and it's built annu-

ally into Harry & David's budget.

"To handle a peak, you must pay attention to the way you staff up," McLeod says. Once the peak has passed, you have to staff down. "It's difficult to hire someone, train them for a few days, have them work for you for six weeks and then say good-bye."

In order to make sure it gets good people

for the temporary work, Harry & David offers a highly competitive paycheck and employee discounts that the temps can use for their own Christmas presents. McLeod says that the temps come back year after year. As a result, customers always get a trained voice on the other end of the line.

Bear Creek has a depart-

ment dedicated to training seasonal employees. Last year, that practice bore fruit when heavy snow and ice closed the Ohio call center for a time between Thanksgiving and Christmas. Within 48 hours, McLeod had a temporary office in a conference center in Medford set up for a SWAT team of 50 seasonal and permanent employees ready, willing and trained to man the phones. Disaster averted. If the shadow staff hadn't already been trained, McLeod believes the triage

HARRY & DAVID

Packages shipped
between Nov. 23 and
Dec. 23:

5.2 million

In an average month:

235,000

DB2 software

Based on TPC-C, TPC-W and TPC-H benchmarks. DB2: 440,879.95 tpmC, \$25.03/tpmC, availability date 12/7/00. Oracle: 230,533 tpmC, \$44.62/tpmC, availability date 7/30/01. TPC-W: 100,000 item count results, DB2: 4 WIPS, \$136.80/WIPS, availability date 6/8/01. Oracle: none posted. TPC-H: 100GB results, DB2: 2,733 QphH, \$347/QphH, availability date 10/31/01. Oracle: none posted. TPC-C: 100GB results, DB2: 2,733 QphH, \$347/QphH, availability date 10/31/01. Oracle: none posted. TPC-W and TPC-H are trademarks of the Transaction Processing Performance Council (www.tpc.org). IBM, the e-business logo and DB2 are registered trademarks of International Business Machines Corporation in the United States and/or other countries. Linux is a registered trademark of Linus Torvalds. UNIX is a registered trademark of Open Group in the United States and other countries. Windows is a registered trademark of Microsoft Corporation in the United States, other countries, or both. Other company product and service names may be trademarks or service marks of others. © 2001 IBM Corporation. All rights reserved.



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YOU NEED A DIFFERENT KIND OF SOFTWARE.

would not have been successful. It's common practice for companies to contract with third parties if they need extra warehouse space or a temporary building to handle increased seasonal demand, but when it comes to staffing, the question of whether to outsource becomes more complicated. "If the positions you want to outsource are

customer-facing, be very careful," Cap Gemini Ernst & Young's Kistler says. "You need a flexible workforce, but it's terrible for a customer if they call during a holiday and they get a first-day trainee on the phone."

HONEYBAKED HAM

Hams shipped from mid-November through Christmas:

1.3 million

In an average month:

20,000

The HoneyBaked Ham Co. of Georgia learned how *not* to outsource its catalog call centers the hard way. The 42-year-old, \$130 million company does almost 60 percent of its business during the Thanksgiving, Christmas and Easter holiday seasons, and customer orders for those holidays begin three to four weeks out. To handle the rush, the Atlanta-based company contracts from October to January with a third-party call center. Several years ago, it experimented with outsourcing the entire customer fulfillment process and got the door slammed on its fingers.

"We outsourced everything—from the order call to inventory management and shipping," says Chuck Bengochea, COO of the Georgia HoneyBaked. "It didn't work out. We ended up disappointing far too many customers, and we took it back in-house."

The company eventually took the service provider to court over the problems it suf-

CIO.COM

Read more about this topic in our **SUPPLY CHAIN MANAGEMENT RESEARCH CENTER** at www.cio.com/scm.

Crystal Ball Technology

Five of the top demand-forecasting software products

i2 TECHNOLOGIES

www.i2.com

Product: i2 Demand Planner

Differentiator: Demand planning integrated with channel collaboration and promotional planning

Industry focus: Semiconductor, automotive, consumer goods and retail

Customers: Siemens, Home Depot, TaylorMade

Market share*: 24 percent

SAP

www.sap.com

Product: APO Demand Planning (part of mySAP Supply Chain Management)

Differentiator: Collaborative planning between partners, manufacturers and suppliers

Industry focus: Discrete manufacturing, consumer product manufacturing and retail, process manufacturing

Customers: Colgate-Palmolive, Palm, Nestlé

Market share*: 6 percent

MANUGISTICS GROUP

www.manugistics.com

Product: Manugistics NetWorks Demand

Differentiator: Demand planning closely intertwined with a larger supply chain management application

Industry focus: Retail, automotive, pharmaceuticals

Customers: Unilever, Rohm & Haas, Fuji, Vodafone

Market share*: 5 percent

J.D. EDWARDS & CO.

www.jdedwards.com

Product: OneWorld Advanced Planning

Differentiator: Integrates demand planning and demand collaboration, and draws together historical, regional, product and seasonal data

Industry focus: Consumer package goods, process manufacturing, discrete manufacturing, distribution

Customers: BMW, Johnson Wax Professional, Coca-Cola/Femsa

Market share*: 3 percent

LOGILITY

www.logility.com

Product: Voyager Demand Planning

Differentiator: Incorporates historical and point-of-sale data; creates graphical snapshot that includes item, location, customer or group

Industry focus: Consumer packaged goods, retail, food and beverage

Customers: Sax, Heineken USA, ConAgra Foods

Market share*: 1 percent

**Market share percentages calculated by license revenue for supply chain management software for 2000 according to AMR Research.*

-Daniel J. Horgan

fered—which, according to Nancy Gibson, senior vice president of marketing at the Georgia HoneyBaked, included more than 20,000 orders that did not ship on time.

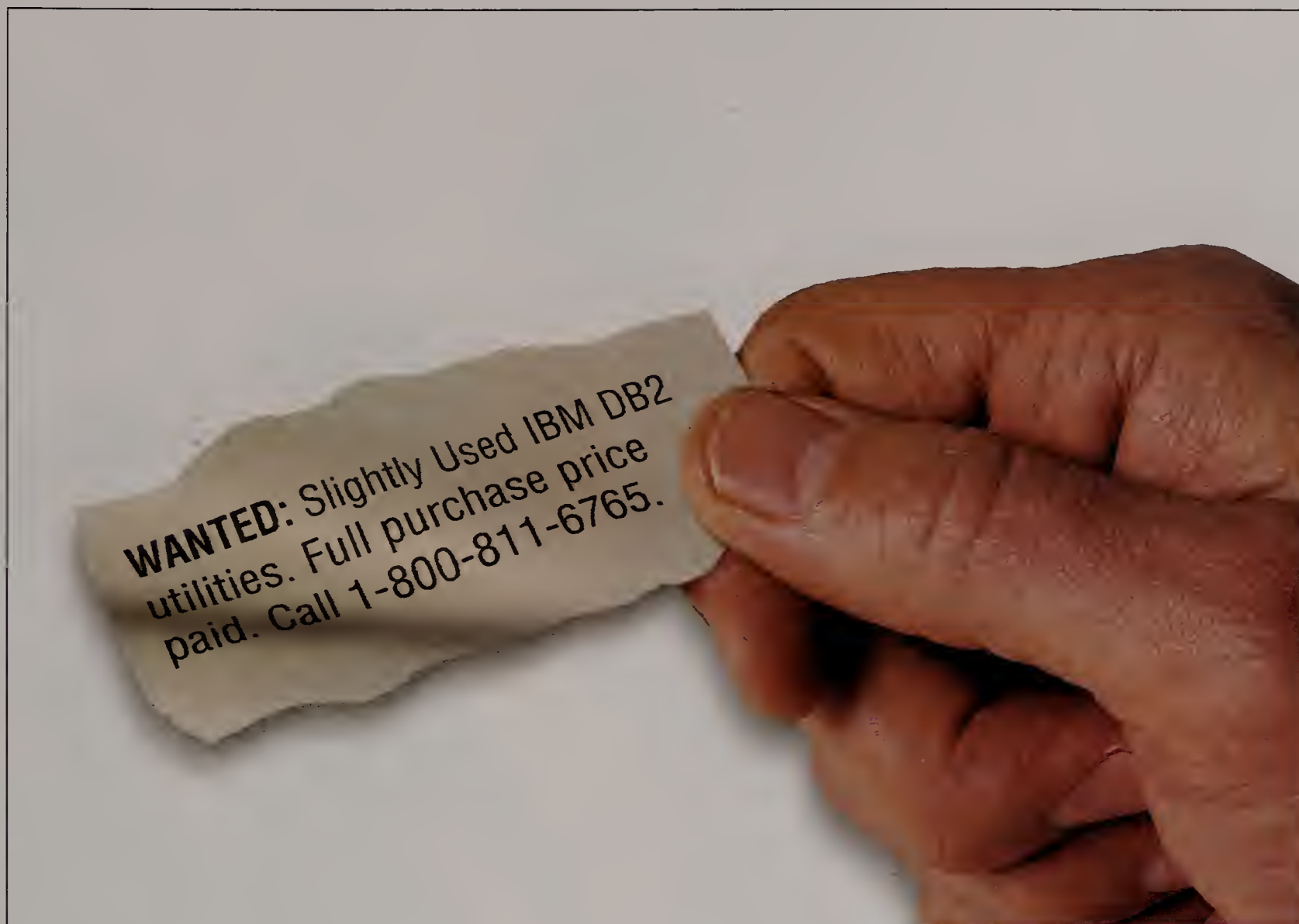
"It's one thing if a toy doesn't arrive on Christmas," Gibson says. "It's a whole different story if your Christmas dinner doesn't show up."

Designing your supply chain operations to handle seasonal spikes demands taking a

hard look at your data and planning on a continuous basis. You don't have much choice about it. Either you do it and stay in the game, or you don't and you end up eating year-old Peeps.

Not a happy prospect. **CIO**

Do you have any tips for managing a supply chain? Let Staff Writer Simone Kaplan know at skaplan@cio.com.



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REAL WORLD

ACADEMY



*If CIOs want better graduates,
they're going to have to step up
to the chalkboard to get them*

BY JASON COMPTON

How to TAKE OVER the Classroom

Reader ROI

- ▶ Learn how one company teamed with a local university to get skilled workers
- ▶ Find out why CIOs should consider teaching to get workers with the right skills
- ▶ Get the scoop on the latest in IT schools

Chances are you have a number of openings in your IS department. You're not alone. There are an estimated 425,000 unfilled IT worker positions nationwide. And pretty much like every other CIO, you've complained that there just aren't enough qualified candidates for the jobs.

CIOs love to point the finger at academics and claim they're not producing the kind of graduate who can become a seamlessly productive employee from day one. Educators don't see it that way.

"Corporations have been wanting universities to solve their hot problems, with Java [experience] and MCSE [certifications]," says Jack

Suess, CIO of the University of Maryland in Baltimore county. "That was never our mission—to be solving these kinds of very specific problems in a particular time frame."

It seems to be a standoff. Corporations want grads to be conversant with everything from the shiniest new programming language to the creakiest minicomputer in the vault. Schools continue to focus on balanced curricula. Yet schools and CIOs can get along. In some cases, companies are going into the classroom and taking over curricula. In other cases, teachers are taking sabbaticals in the real world so that when they return to the classroom they have more up-to-date skills. And there's a new educational

movement afoot to marry what academics want to teach with the skills that CIOs want in new hires. But it takes work both inside and out of the ivory tower.

REACHING INTO THE CLASSROOM

Reconciling industry's need-it-now goals with university ideals isn't necessarily impossible. In fact, it can work beautifully when the two sides team up. One case in point is UPS. In the beginning of 2000, UPS's Atlanta-area operations desperately sought a near-term infusion of Web layout and development talent. Fortunately, CIO Ken Lacy and Dudley Land, former vice president of customer automation and UPS operations, found a helpful partner in Georgia State University. Ephraim McLean, professor of information systems, and David McDonald, academic program director in the computer information systems department, were eager to help UPS close its skills gap quickly.

The result of their efforts was a 21-week, dual-certificate prototype that ran from May through October. Half of the students—those destined for content creation—had to attend only the first 11 weeks for an HTML development certificate. The second group completed the full course for a grounding in both design and programming. There was no shortage of student interest: UPS targeted career-changers, who accounted for the 1,600 applicants for 17 open spots.

UPS's goal was to create IT workers who could function from day one, both technically and professionally; and the desire was that every graduate would be immediately transitioned to a job at UPS. Although there's nothing to stop new grads from leaving after the first day to shop their newfound skills elsewhere, UPS screened for loyalty, among other traits, when narrowing down the substantial stack of applicants.

All sorts of synergies helped make the partnership between UPS and Georgia State happen. The state of Georgia's Intellectual Capital Partnership Program grants meant

students could receive a state paycheck (actually a loan, waived if the student stays in a Georgia high-tech job) for attending the courses. Georgia State provided the instructors, and UPS provided the facilities. As of press time, the seven who completed the first half of the program have been hired by UPS.

THOSE WHO CAN

Georgia State isn't the only school aware of the needs of business. Many other schools are not deaf to the input of industry, although employers will likely never be truly satisfied, says Kevin LaMountain, dean of career and student services at technical degree school DeVry Institutes in Phoenix. "A person would never, ever graduate from college if we put in every skill an employer wanted them to have," he says. "We have to give [students] broad enough based knowledge so they can ride every ebb and flow. We're not seeing any demand for Web developers at all coming through career services [now], but a year ago there were probably five employers on our advisory board where that's all they wanted."

Even if an academic department head is

The Bigger Problem

Graduates without Java skills? That's only the tip of the iceberg.

SOME BELIEVE THAT THE UNIVERSITIES, perhaps lured too far away from their general educational goals by the flood of technology, are failing at a more fundamental level. "I see a woeful number of graduates who come out who can't even write a coherent document of any kind—specifications, cost/benefit analysis, even a white paper. They just can't write," says David Johnson, senior vice president and CIO of Trans-america Real Estate Tax Service in Dallas. "They know a lot about tool sets, a lot about statistical development, C++ and Cobol, and how compilers are put together, but they have very little critical skills thinking. They can't answer the question of *why* we would want to be doing this in a business."

While Johnson stresses that his major complaint is in the quantity, not the quality of new hires available to him, he remains upset about graduates' lack of basic abilities. "I can expect that I'll bring somebody on board and I might have to bring them up to speed on technical skills. I can give that to them and get there quickly," he says. "What I *don't* have the time or stomach for is to train somebody how to think through things, how to ask hard questions, communicate and run a meeting."

—J.C.

willing to fast-track a hot skill, finding capable teaching staff is a problem. People with the proven competency in those areas are not in the faculty lounge. "Are we going to find someone with 15 years experience in Oracle [to teach a database course]?" says LaMountain. "Someone with that experience is worth \$150,000 to \$200,000 to a company, and there's no way any school or university can afford to have them full time."

Neal Young is such an example. Currently a senior research scientist at Cambridge, Mass.-based Akamai, a provider of content delivery services, Young went on leave from a tenure-track computer science professorship at Dartmouth College in 1997 (he officially quit in April 2001), in part to cash in on the considerable premium his skills commanded in the marketplace. He is interested in returning to the academic world some day, but he'll go back with a greater awareness of the strengths of learning in the classroom and learning on the job. "In a business environment, what you learn is more chaotic," he says. "It's useful to separate education and work, much the same way you separate being a child and an adult—you don't raise a child by making them go through all the things an adult has to go through. You give

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them a protected space to go through the idealistic things first.”

LaMountain thinks there is a way for the schools and the workplace to both get what they want: The companies that lock up talent like Young need to share him as part-time faculty or at the very least lend him out for instructor training. David Johnson, senior vice president and CIO of Transamerica Real Estate Tax Service in Dallas, agrees. He suggests widespread industry exchange programs. Professors would be put to work in industry, many for the first time, to gather the exposure and experience they need to stay current. They’d swap their desks with a seasoned IT professional who can teach highly valuable skills. Johnson knows firsthand the value of straddling both worlds; he taught undergraduate and graduate-level technology courses part time for a decade.

Sharing personnel between the boardroom and the classroom would benefit all sides. “The fact is, if you’re a faculty member, you probably learned your technology five years ago,” says University of Maryland’s Suess. “The industry would like us to be producing graduates six to nine months later in [the hot new language] because none of their people know it either, but we have the same problems. It takes time to ramp up the skill base of people who are ultimately going to teach it.”

A MORE PERFECT UNION

While many computer science programs do adjust their curricula to reflect new strategies, there is a growing sense that they are simply not the optimal vehicle to assist with changing the disconnect. In general, employment-gear professional schools such as DeVry and ITT Technical Institutes portray themselves as more likely than the average ivory tower to heed industry requests. DeVry programs typically leave roughly 25 percent of the content open to the discretion of local instructors and administrators so that skills and emphasis can be tweaked to suit the demands of

area employers, LaMountain says.

Traditional academic institutions aren’t about to let professional schools trump them. Recently, business school-sponsored IT and computer information systems programs have been making a more conscious effort to align themselves with the interests of the hiring community. These new, cross-discipline initiatives, such as the four-year School of Informatics at Indiana University in Bloomington, are seeking to better match schooling with industry goals. And this academic initiative might just be the wave of the future. “It’s focused much more on the best practices, the best uses of applications in IT [than traditional CIS] in a whole variety of industries,” including mechanical and med-

ical-focused informatics programs, says Michael McRobbie, Indiana University CIO and professor of computer science. The impetus for the new school—Indiana’s first in 20 years—came directly from the marketplace. “We established it because of feedback from business and industry. They needed people with broader skills,” he says.

McRobbie points out that while computer science departments do a good job of steering clear of potentially ephemeral hot skills, some areas of serious demand, such as a grounding in Microsoft technologies, need to be addressed at the highest level of education. “There’s no doubt universities are not focusing enough on providing training in those areas,” he says.

Peter J. Denning, professor of computer science at Fairfax, Va.-based George Mason University, strongly advocates the creation of IT schools such as IU’s School of Informatics and his own institution’s School of Information Technology and Engineering. In the August 2001 issue of *Communications of the ACM* (Association for Computing Machinery), Denning outlines a model cur-

CIO.com

The Training Files

For a collection of CIO stories on **I.T. EDUCATION AND TRAINING**, visit www.cio.com/printlinks.

riculum that includes a mandatory semester-long internship and three semesters of a weekly professional responsibility workshop in addition to theoretical and applied technical learning. (Go to www.cio.com/printlinks for a PDF version of the curriculum.) While schools that are working on meeting such a model number in the dozens—among them the School of Com-

Sharing personnel between the boardroom and the classroom would benefit all sides.

puter Science at Carnegie Mellon, College of Computing at Georgia Tech, and the College of Information Science and Technology at the University of Nebraska at Omaha—he is optimistic that market pressures have posed the idea for explosive growth.

Despite the lingering divide, both academia and industry are showing signs of collaboration. Faculty panels do not stay up late at night trying to sabotage IT hiring managers, and the truth of the matter is that those managers need the students coming out of the school system. The path to training better IT workers may need to be greased every so often by improving company-academia communications or by encouraging companies to loan out employees as instructors, but at least the drawbridge to the ivory tower stands lowered. The quest to build the perfect 23-year-old who can effectively wield a mouse on day one, however, will likely never end. **CIO**

Send your thoughts on IT education to us via e-mail at letters@cio.com. Freelance Writer Jason Compton is based in Evanston, Ill.



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ENTERPRISE VALUE RETREAT & AWARDS CEREMONY

Agenda



JOIN US AT THE TENTH ANNUAL *CIO Enterprise Value Retreat* for a two and a half day, intensive case study program, led by Harvard Business School's F. WARREN MCFARLAN, where we will examine how CIOs can more rapidly and reliably deliver performance to the overall organization. The stakes have never been higher!

SUNDAY, JANUARY 27

8:00 AM – 1:30 PM

Partners Golf Tournament

Enjoy a round of golf on the Ventana Canyon Course

3:00 PM – 6:00 PM

Registration

8:00 PM – 9:30 PM

Partners Café Reception

Meet and network with other participants, Award Winners and Retreat Partners in our informal networking lounge.

MONDAY, JANUARY 28

7:30 AM – 8:30 AM

Registration and Breakfast

8:30 AM – 9:00 AM

Opening Remarks and Retreat Welcome

ABBIE LUNDBERG
Editor in Chief, CIO Magazine
What is Value? Lundberg explains how the decisions and

deliberations of the Enterprise Value Awards judges reflect a shift in the IT value proposition — and what it means for businesses today.

9:00 AM – 10:30 AM

Retreat Introduction and Welcome Address: The Internet-Transformed Organization

F. WARREN MCFARLAN,
Senior Associate Dean, Director of External Relations, Albert H. Gordon Professor of Business Administration, Harvard Business School
In the aftermath of the attacks, Y2K and the dotcom debacle, both CIOs and general managers might be forgiven for thinking that things would be moving at a less hectic pace in the IT world. In fact, exactly the opposite is true as the Internet, intranets and extranets are deeply impacting the operations and competi-

tive positioning of most major corporations. The critical question has become whether to be a fast adopter or a cautious follower. Different firms have followed both strategies, with great success. This work is taking place on a global scale with the impact the same in Dallas as in Hong Kong. The core of this Retreat will be built around one of the largest (and explosively growing) credit card providers in the U.S.

10:30 AM – 10:45 AM

Enterprise Value Award Winner Presentation

10:55 AM – 11:25 AM

Mid-Morning Break

11:35 AM – 12:35 PM

Will Computers Become People in 30 Years?

JARON LANIER, *Lead Scientist, National Tele-immersion*

Initiative; *Chief Scientist, Eyematic Interfaces*

We are used to hearing claims that when computers become a million times more powerful in about 30 years, they will become equivalent to humans or greater than humans. In order to examine whether this might be true, we must rethink a range of questions such as: "Why did evolution take so long?" and "Why is contemporary software so unreliable?"

12:35 PM – 12:50 PM

Enterprise Value Award Winner Presentation

12:50 PM – 2:00 PM

Luncheon

2:00 PM – 2:45 PM

Industry Briefings

2:50 PM – 3:35 PM

Industry Briefings

To enroll or for more information, call 800 355-0246, fax the form to 508 879-7720, or visit our website at www.cio.com/conferences

3:45 PM – 4:15 PM

Coffee Break

4:25 PM – 5:10 PM

Special Presentation on Security and Privacy

CIO, in conjunction with the U.S. Department of Commerce's Critical Infrastructure Assurance Office, hosts a special presentation on security and privacy issues.

5:10 PM – 5:40 PM

Global Industry Value-Chain Restructuring

F. WARREN MCFARLAN

Every aspect of the industry value chain is potentially transformed by IT. Inbound logistics, outbound logistics, sales and infrastructure all operate in an entirely different way in this new world.

Organizations are rethinking their core competencies to decide what they wish to keep inside the boundaries of the company, and what they choose to delegate to



Lowes Ventana Canyon Resort

The Loews Ventana Canyon Resort, where the Catalina foothills give way to the Sonoran Desert, covers its 93 acres of resort area with two Tom Fazio designed golf courses, a 2.5-mile par-course for walking or jogging, several waterfall-dotted nature trails, biking areas, two pools, eight lighted tennis courts, a croquet court, and of course our full-service spa.

others for execution. This realigning of what lies inside/outside the corporation is one of the deep, IT-enabled transformations of the early 21st century.

5:45 PM – 6:45 PM

Partners Café Reception

Catch up with other participants in our informal lounge, share ideas and experiences.

7:00 PM – Midnight

Partner Hospitalitys

TUESDAY, JANUARY 29

7:30 AM – 8:30 AM

Breakfast

8:30 AM – 8:45 AM

Corporate IT Spending Trends — Where are They Headed?

GARY BEACH

Group Publisher, CXO Media Inc.

Every month for the past year and a half *CIO Magazine*, in partnership with Ed Yardeni, chief investment strategist of Deutsche Banc Alex.Brown, has surveyed a panel of senior executives on current and future IT spending and other issues. Beach presents an overview of the latest results and emerging trends from the *CIO Tech Poll*.

8:45 AM – 9:00 AM

Enterprise Value Award Winner Presentation

9:00 AM – 10:00 AM

E-Commerce Management

F. WARREN MCFARLAN

Even as the world of B2B exchanges has fallen apart, the challenges and economic opportunities implicit in implementing B2B links and B2C links are moving forward rapidly (the bottom line contribution can be enormous). Two very different industries are looked at; one is the world of B2B evolution in the telecommunications industry and the extraordinary new standards of support that have been established; the other captures the major repositioning of various players in the financial services industry. This battle consumes the attention of everyone from the CEO to the CIO in trying to get it right.

10:00 AM – 10:15 AM

Enterprise Value Award Winner Presentation

10:25 AM – 10:55 AM

Mid-Morning Break

11:00 AM – 11:45 AM

Industry Briefings

11:55 AM – 12:10 PM

Enterprise Value Award Winner Presentation

12:10 PM – 12:55 PM

Globalization

F. WARREN MCFARLAN

Almost unimaginably, technologies have spread out across the globe and provided fundamentally new ways of distributing work and linking organizations together. The special challenges posed by certain environments, such as China and India, are dealt with. It is a vastly shrunken global arena that we are dealing with today.

1:00 PM – 3:45 PM

Luncheon and Case Study Workgroups

3:45 PM – 5:45 PM

Informal Networking and Recreation

5:45 PM – 6:45 PM

Enterprise Value Awards Reception

7:00 PM – 9:30 PM

Enterprise Value Awards Dinner and Ceremony

Come raise a glass and toast the winners at our black tie dinner and ceremony, proudly underwritten by Genuity.

9:30 PM – 11:30 PM

Dessert Reception Hosted by Genuity

Cap off the evening with a special post-awards reception.

WEDNESDAY, JANUARY 30

7:30 AM – 8:30 AM

Breakfast

8:30 AM – 10:30 AM

Case Study Workgroup Presentations and Discussion

10:30 AM – 10:45 AM

Mid-Morning Break

10:45 AM – 11:30 AM

Reflection

F. WARREN MCFARLAN

The Retreat closes with a discussion of the specific management practices currently in use by leading adapters to the new information age.

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Storage Gets Caught in the Net

IP storage promises faster, cheaper and wider storage area networks

BY JOHN EDWARDS

Edited by Christopher Lindquist. Send your thoughts and ideas for future columns to et@cio.com.

"**STORAGE IS TO** schools what Miracle Grow is to gardens," says Tom Walker, executive director of library and information services at Decorah, Iowa-based Luther College. "The more storage you put at the hands of academics, the more likely

they are to fill it up with their projects." Walker is hoping that IP storage, a promising new way of building storage area networks (SANs), will give his 2,600-student liberal arts school richer storage pastures.

IP storage...Cell computing...Printing...Wireless development

IP storage, which uses the Internet to swiftly transport data from users to storage arrays around the world, is just beginning to emerge from the development mist. Cisco, CNT, IBM, Lucent Technologies and Nortel Networks are among the many vendors that have invested deeply in IP storage and are just now starting to ship their first products based on the technology. "There's a huge IP structure in place, and it only makes sense to take advantage of it," says Brice Clark, a director of the Colorado Springs, Colo.-based Storage Networking Industry Association's IP Storage Forum.

IP storage is designed to address the cost and performance deficiencies that are inherent in fibre channel (FC), the data transport technology that's currently being used to build most SANs. But as IP storage sys-

tem vendors try to grab a foothold in IT departments worldwide, questions remain about the field's evolving standards and whether vendors' cost savings, performance and deployment promises will pan out in the real world. "This is the next big push in terms of storage," says Arun Taneja, a senior analyst at the Enterprise Storage Group, a Milford, Mass.-based storage industry research consultancy. "Not all the issues are resolved, but there is so much value in the concept that it's worth working on it a bit."

Cost Cutting

Although IP-based storage equipment isn't always less expensive than FC hardware, IP technology can help organizations cut costs by using existing Internet-compatible hardware for storage. For example, a

company could sidestep the need to purchase dedicated FC storage equipment by using its application servers to store data.

The technology can also help organizations lower employee overhead. "You can use your IP engineer to manage your storage network," says Mark Cree, general manager of Cisco's Minneapolis-based storage router business unit. "In the past, these storage experts would make at least 50 percent more than an IP engineer would."

At Luther College, IP storage is a way to expand storage capacity without emptying the school's bank account. "Fibre channel was well outside of our budget range," says Walker, who instead turned to IP storage technology, including IBM's IP Storage 200i, a storage array that attaches to the school's Ethernet network.

Walker wasn't as worried about the cost of gear as much as the expense of training his staff in FC technology. "The basic issue is that I don't want to have to add another competency to my thinly spread staff," he says. "My people use IP every day, day in and day out. They know it. They love it."

Walker also doesn't like the idea of buying in to a solution that would lock his department in to one vendor's vision of a storage strategy. "In the education industry there's a real phobia about building dependency on outsourced vendor relationships," he says. "With IP storage, we're free to easily mix products from different vendors."

Faster, Farther, Safer

Reduced costs are only one side of the IP storage story. The technology also promises improvements in speed, geographic scope and even data security. On the speed front, IP storage's current advantage is minimal. First-generation IP storage systems are designed to operate at speeds of up to 1.25Gbps—not much faster than FC, which maxes out around 1.06Gbps. But IP storage should get a push sometime next year, when the Institute of Electrical

The Name Game

LIKE ALL INTERNET-connected devices, IP storage units need a unique identifier that will allow servers to find and communicate with them. Currently, IT managers can manually set identification addresses on each device. But as corporate IP storage networks grow in both size and geographic scope, this task is becoming increasingly burdensome. This is the problem the Internet Storage Name Service (ISNS), a device discovery and management protocol for IP storage networks, is designed to remedy.

ISNS would work like a domain name server to ensure that servers could find storage devices based on an Internet small computer system interface (iSCSI). ISNS would also allow managers to designate the servers that can communicate with specified storage devices. The technology behind the protocol was developed by several network heavyweights including IBM, Intel, Nishan Systems and Nortel Networks. The specification is currently under review by the Internet Engineering Task Force, an Internet standards-setting organization.

With so many major backers, ISNS's approval appears virtually assured. Once that happens, network storage device makers will likely rush to embrace the technology. ISNS's supporters have already released the protocol's software as open-source code. (There is one caveat: In this world of rapidly changing standards, vendors are also contemplating extensions directly to iSCSI to support naming.)

ISNS is designed as a compact protocol that can be easily added to a variety of iSCSI adapters and target devices, including storage arrays and routers, says Aamer Latif, president and CEO of San Jose, Calif.-based IP storage product maker Nishan Systems. "ISNS is an important step in making iSCSI the leading network storage technology."

By making iSCSI-based SANs easier to manage, ISNS could draw more organizations to IP storage. "It removes a potential obstacle to adoption," says Paul Mattson, iSCSI business manager for IBM's Raleigh, N.C.-based storage networking division. "For major corporations, the idea of manually setting hundreds or thousands of individual addresses isn't very appetizing. This is a solution."

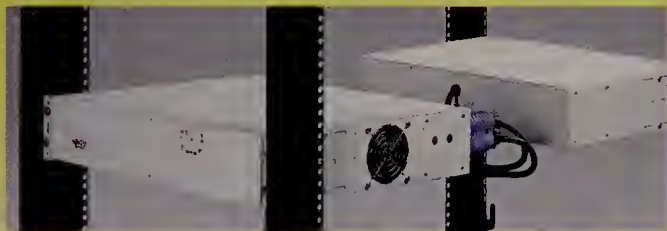
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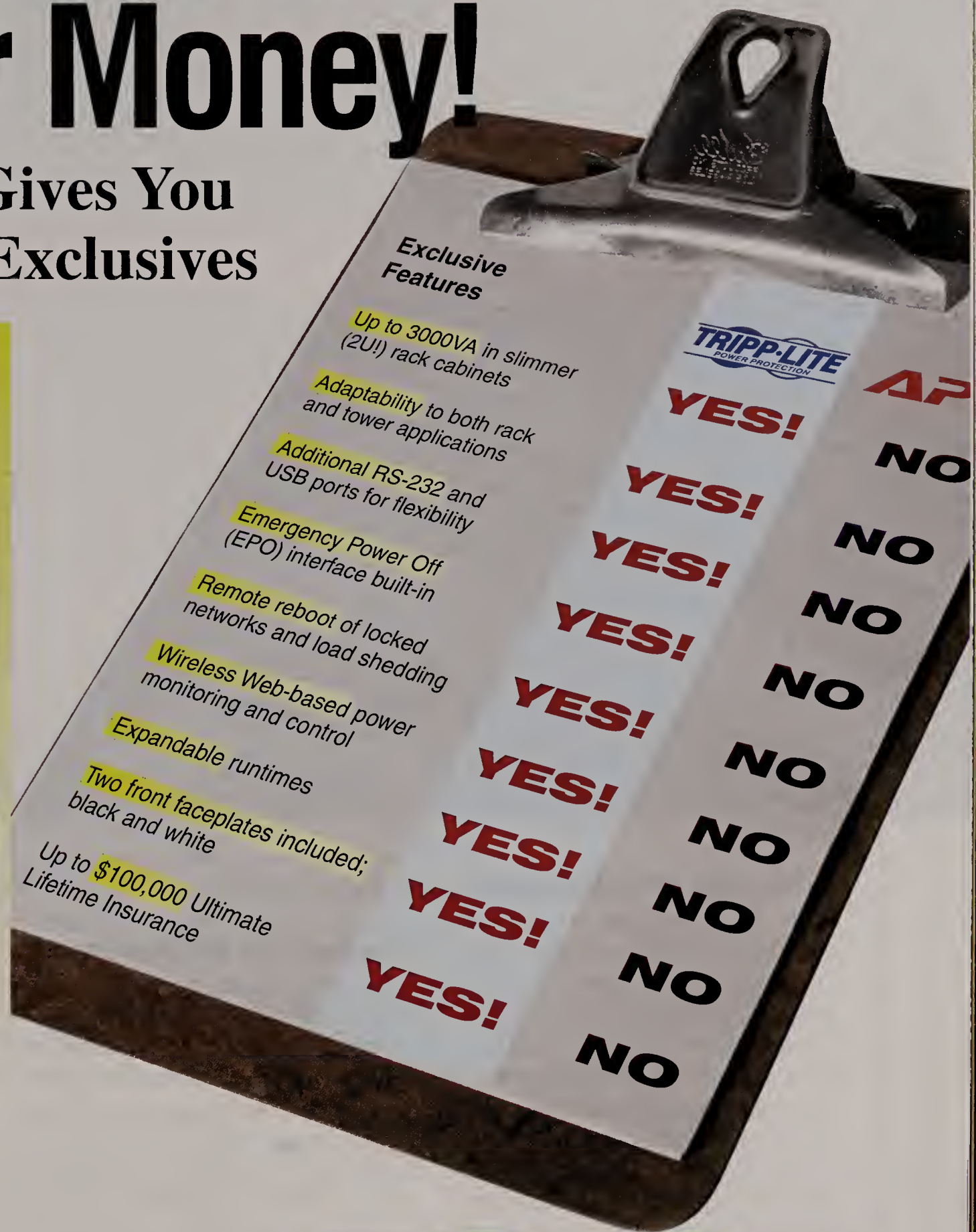
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and Electronics Engineers is expected to put its stamp of approval on a proposed 10Gbps Ethernet standard.

Perhaps even more impressive than IP storage's potential for slashing costs and boosting speeds is its unlimited reach. While fibre channel technology limits its spans to about six miles, IP storage's horizons are virtually unlimited, thanks to the Internet's global scope. This means that an organization can arrange to have its data stored in another state, another country or another continent. "A global company can take advantage of storage space that's available across the street or around the world," says Enterprise Storage Group's Taneja.

Another big benefit of IP storage is that it usually requires little or no additional investment in security. Leading security tech-

nologies, such as firewalls and virus scanners, which most organizations already use to protect their Internet data transfers, can also be applied to safeguarding IP storage data. "You can view it as kind of a built-in protection," says Cisco's Cree.

A Storage World Divided

While industry experts are virtually unified in their praise of IP storage as a concept, the field itself is divided into two camps, each supporting a protocol that's incompatible with the other. The Internet small computer system interface (ISCSI) allows the transport of SCSI I/O traffic over standard IP networks, such as Gigabit Ethernet, and is designed to bring plug-and-play simplicity to networked storage devices. "It's made of building blocks that people can deal with," says Paul Mattson, ISCSI business manager for IBM's Raleigh, N.C.-based storage networking team. IBM, Cisco and Nortel are among ISCSI's proponents.

The Internet FC protocol (IFCP), on the other hand, allows native fibre channel de-

vices to be connected to an IP network. The IFCP protocol, supported by Lucent Technologies and several other companies, is designed to appeal to organizations that have an existing investment in FC technology. While the flexibility of the ISCSI standard gives it the best long-term prospects, most experts view IFCP as the near-term winner. This is because IP storage switches and related products will allow organizations to extend their existing FC SANs across metropolitan area networks (MANs) and WANs without distance limitations. "IFCP lets you enter IP storage without junking everything you have," says Taneja.

Although choosing IFCP may be a no-brainer for an organization with an existing FC investment, the choice isn't as obvious for CIOs just stepping in to the network

storage market. Given the absence of a clear-cut standard, there's always the chance of picking Beta over VHS and facing trouble down the road. "This may mean additional cost and even downtime in the future in order to upgrade the system," says Robert Passmore, a storage analyst at Gartner in Stamford, Conn.

Theoretical Wonderland

Despite the hoopla surrounding IP storage, many storage industry observers are skeptical that the technology can live up to its supporters' extravagant cost-cutting and performance-boosting promises. With equipment just hitting the streets, real-world benchmarks haven't yet been established, so vendors are free to live in a theoretical wonderland. "It's hard to compare performance right now because it's not the same, so it gets into an apples and oranges kind of thing," Passmore says.

Min Christopherson, IT director at DNA Sciences, a Fremont, Calif.-based genetics research company, hopes the IP storage system he started working on late last year will

Companies to Watch

Zone Labs

ZONE LABS maker of the popular ZoneAlarm line of PC firewall products, still plans to help home- and small-office users keep hackers out of their systems. But the company will also offer an enterprise-class tool called Zone Labs Integrity that combines Zone Labs' award-winning PC firewall technology with centralized management of security policies and Internet usage.

Integrity is based on ZoneAlarm's client-side technology, which protects computers from unrequested outside traffic, prevents transmission of unauthorized outgoing traffic and quarantines suspicious e-mail attachments. It then adds features that allow IT managers to establish security policies, communicate them to users, enforce them and generate security reports.

The product can take advantage of existing directory, naming and authentication services, including lightweight directory access protocol and remote access dial-in user service, and integrates with third-party network management products. IT managers can also use the product to protect computers used by remote workers outside the corporate network.

Pricing for Integrity begins at \$15,000 for the server and \$80 per client. For more information, visit www.zonelabs.com or call 415 341-8200.

-Christopher Lindquist



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help him cut costs, but he isn't sure just how much money he'll save. "It's not fair to crunch numbers right now, because there's so much more to this technology than just the equipment cost," he says.

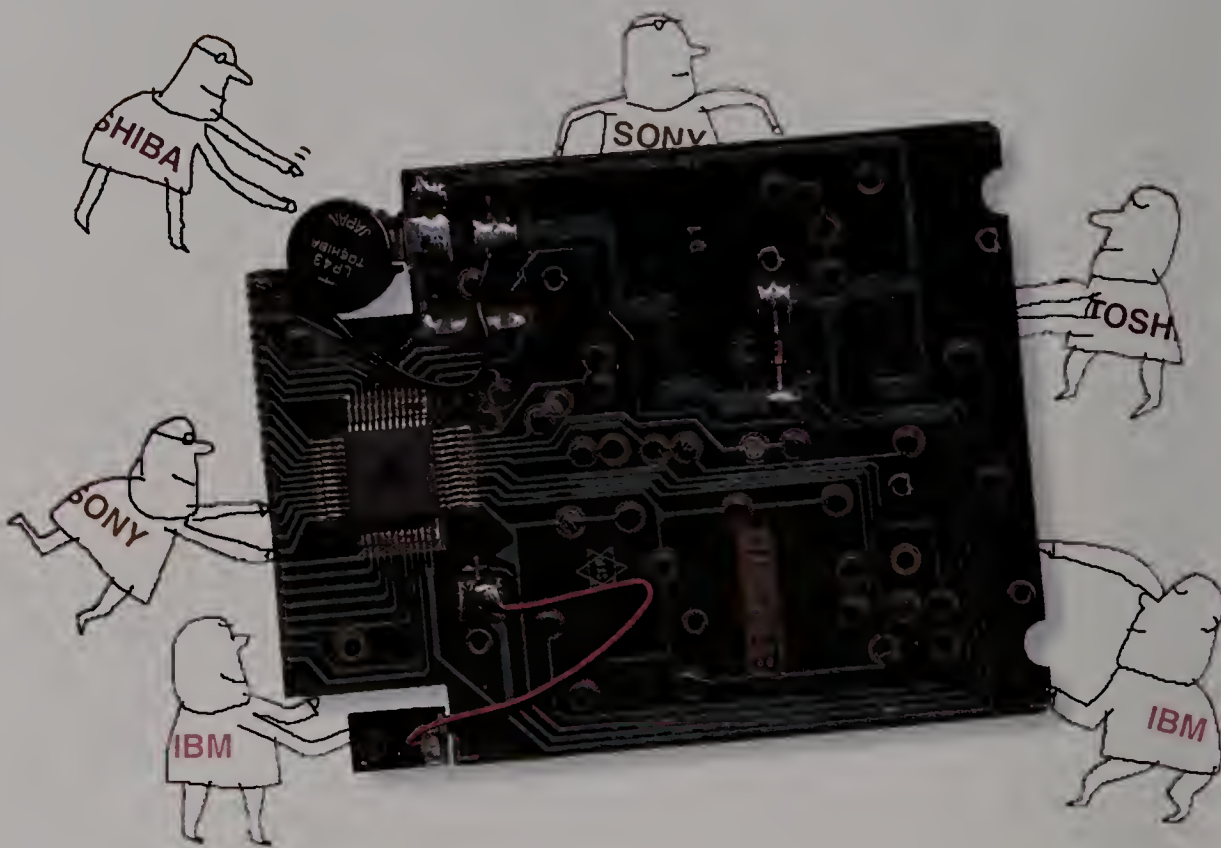
One of the extras IP storage gives its adopters is the headache of network latency—the time between initiating a request for data and the beginning of the actual transfer. High latency times can degrade performance to well below FC levels. But latency woes are solely a network problem, claims Wayne Lam, vice president of marketing for IP storage vendor FalconStor in Melville, N.Y. "If you have a well-designed network, latency isn't an issue," he says. "You can't blame IP storage for this."

Another potential trouble spot is IP storage's impact on an organization's existing network resources. CIOs need to carefully assess the state of their IP networks before committing to an IP storage strategy, says Mark Knittel, group vice president of worldwide product operations at Minneapolis-based storage networking vendor CNT. "IP storage is something of a bandwidth hog, and many IP networks aren't able to handle this type of use," Knittel notes that upon adopting IP storage, many organizations opt to send their storage data over a VPN rather than the Internet. A VPN provides added security and allows organizations to tailor network parameters for maximum efficiency.

Despite IP storage's lingering uncertainties and demand for careful planning, many early adopters continue to praise the technology, although guardedly. "You need to have a vision," says Christopherson. "You have to have a sound infrastructure and make sure that it's ready."

Luther College's Walker says the technology requires a CIO to be both cautious and alert. "It's all incredibly complex, so we're moving slowly," he says. "This is probably the most daring thing we've done in a long time." ■

John Edwards (john@john-edwards.com) is a freelance technology writer based in Gilbert, Ariz.



UNDER DEVELOPMENT

Supercomputing

The Power of Cell

TAKING THEIR CUE from the way biological cells cooperate with each other to form a bodily structure, IBM, Sony Computer Entertainment and Toshiba are developing a chip architecture that will let individual processors interconnect and create a larger system.

If everything works as planned, the new architecture—dubbed Cell—will lead to consumer devices that are more powerful than IBM's Deep Blue chess-playing supercomputer, operate at relatively low power levels and provide built-in broadband Internet connectivity.

The companies hope to develop Cell devices capable of multiple teraflops (trillions of operations per second) of processing power, says Lisa Su, broadband business line manager for IBM's microelectronics division in East Fishkill, N.Y. Although the Cell architecture will be built from scratch, Su says, IBM will contribute its advanced semiconductor technology, including its PowerPC knowledge, to the design. Cell devices will incorporate a variety of recent chip design breakthroughs, including copper wiring, silicon-on-insulator transistors and low-K dielectric insulation. At the project's peak, IBM expects to dedicate more than 300 chip architects and designers to Cell's development.

The technology is slated to find a home in a variety of products, including PCs, wireless devices, game consoles, Internet appliances, gateways, switches and routers. "Cell-based products of all types will form the building blocks of larger systems," says Su. "The internal broadband connectivity will allow the processors to be closely linked, creating a network of systems that act as a single, unified supersystem."

The trio's ultimate goal is to define the standard for broadband Internet access, says Andrew Allison, an independent computer industry analyst in Carmel, Calif. "And not just for consumer products," he adds. Allison believes that Cell processors could eventually wind up in an array of office products.

—John Edwards

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550 years later—still no paperless office BY FRED HAPGOOD

WHEN JOHANNES Gutenberg thought up the printing press in 1450, he had only one application in mind: automating the manufacture of indulgences, the get-out-of-damnation cards then sold to anxious sinners by the church. As it turned out, the indulgence business had a scaling problem—mass production turned what had been a tolerated irregularity into the perception of complete corruption. The cultural reaction wrecked not only the market but very nearly the church itself. However, his printing system sidestepped this unpleasantness, spreading within a matter of decades to every corner of civilization. By the 19th century the printing press became an essential arm of commerce, responsible for everything from forms to catalogs to money.

In the Oct. 1, 1992, issue we ran an article covering the implications of the most recent twist in our relationship with print. More and more enterprises were

starting to think of information technology as organized around decentralized groups of PCs. It seemed only natural to manage printing the same way, which meant moving the function out of central, often remote, departments and into workgroups. The growing number of multifunctional devices (which could print, copy and scan) on the market reinforced the idea by making it possible, at least in theory, to move copying out of copy centers and onto the edges of the enterprise as well. If computing was moving closer to users, didn't it make sense for printing and copying to follow?

That's how it seemed to us and to the many vendors whose products we examined in our piece. The actual realization of this vision has been strikingly slow. According to Bruce Dahlgren of printer manufacturer Lexmark, the large, central printing center remained a standard until very recently. There are numerous rea-

wireless

PREDICTIONS

Developer Doings

GIVEN THE FACT that there are more mobile phones than any other wireless device on the planet, it would be easy to assume that wireless application developers would be eagerly targeting the biggest market and excluding others. But a recent study by Santa Cruz, Calif.-based development research company Evans Data indicates that isn't necessarily the case.

According to the "Wireless Developer Survey" (Vol. 2, Fall 2001), 58.6 percent of respondents said they were developing applications for phones, while a nearly equally number—57.4 percent—indicated that they were developing programs for wireless PDAs. Other platforms drew considerably less interest, with only 37.8 percent developing applications for laptops and 15.8 percent working on pager-based products. The company notes that while mobile phones are nearly ubiquitous, PDAs generally have more memory, screen space and other features that developers find appealing.

The report offers additional data about the specific platforms developers are supporting, the time frame for application deployment, the type of applications being developed and more. For purchasing information, visit www.evansdata.com or call 800 831-3080.

—Christopher Lindquist

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sons why that might have happened. Centralization brought economies of scale and the convenience of single points of management. Software that supported network-based printing proved hard to write. Moving printing and copying to the edge of corporate networks sometimes required tinkering with the backbone of the organization (for example, moving copying from the facilities department to IT), and those changes are always slow.

However, the same arguments had been trotted out during the transition to microcomputer-based networks, and that movement took off like a prairie fire. A more subtle possibility for lingering print centralization is that in the early to mid-

tion and display. At least in the business context, display has always been the poor sister; changes in printing technology were bought and sold on the promise of improvements in storage and distribution efficiencies (like microfiche).

Today the huge improvements digital technology has made to information storage and distribution are obvious. Yet no one has developed display technology that can rival, let alone improve on, paper's convenience and comfort level. As a result, information display has become printing's core competence and responsibility.

At the same time, IT-led enhancements in storage and distribution have increased the load on display, since the more information computer networks can remem-

that will be read by one or two people and then discarded.

This emphasis provides a new and more stable rationale for our premise in the 1992 article: that it makes sense to treat printers like PCs, as devices distributed over a network. It also erases the lines between copying, printing and faxing, since from a display point of view, all these technologies raise the same issues (speed, resolution and price). A device that prints digital files doesn't care which technology generated them or whether they were transmitted across a network or created internally by a built-in scanner.

There is one question still up in the air: What is the optimal ratio of printing devices per employee for a given enterprise? Xerox believes that at least with current technology, economies of scale and versatility still matter. "Smaller printers are cheap, but the cartridges are not," says Art Smith, vice president of Worldwide Software Solutions at Xerox Office Systems Group. (He estimates that a large machine can print at half the cost per page of smaller models.) Companies such as Lexmark represent the other end of the spectrum. They imagine devices similar to a distribution of devices so dense that it approaches that of fax machines today. From an IT manager's point of view, both ends assume a high degree of network integration, with features such as automated management of driver libraries, networkwide access to status messages, a faxlike system for matching jobs to locations, and potentially, support for wireless inputs and kiosk-based printing. Tools to manage these issues, like Novell's iPrint, are beginning to emerge.

It may be only a coincidence that the reemergence of paper-based printing coincides with the collapse of tech stocks. But given the digital triumph that many of these formerly high-flying stocks embodied, it is certainly fitting. **CIO**

Since you can't beat paper's convenience, information display is printing's core competence.

'90s everyone knew in their bones that networked PCs were the future, whereas most managers' bones fell silent when they were asked about printing. Even if you didn't believe in a paperless office, the role of printing in the 21st century enterprise was very cloudy. Given that murkiness, it just made sense to keep pushing decisions about the technology to the bottom of the pile.

During the past 18 months or so the situation has changed. A consensus on the future of printing has finally begun to emerge: Printing does have a future, limited in one way, but nearly boundless in another. Printing has historically had three jobs: information storage, distribu-

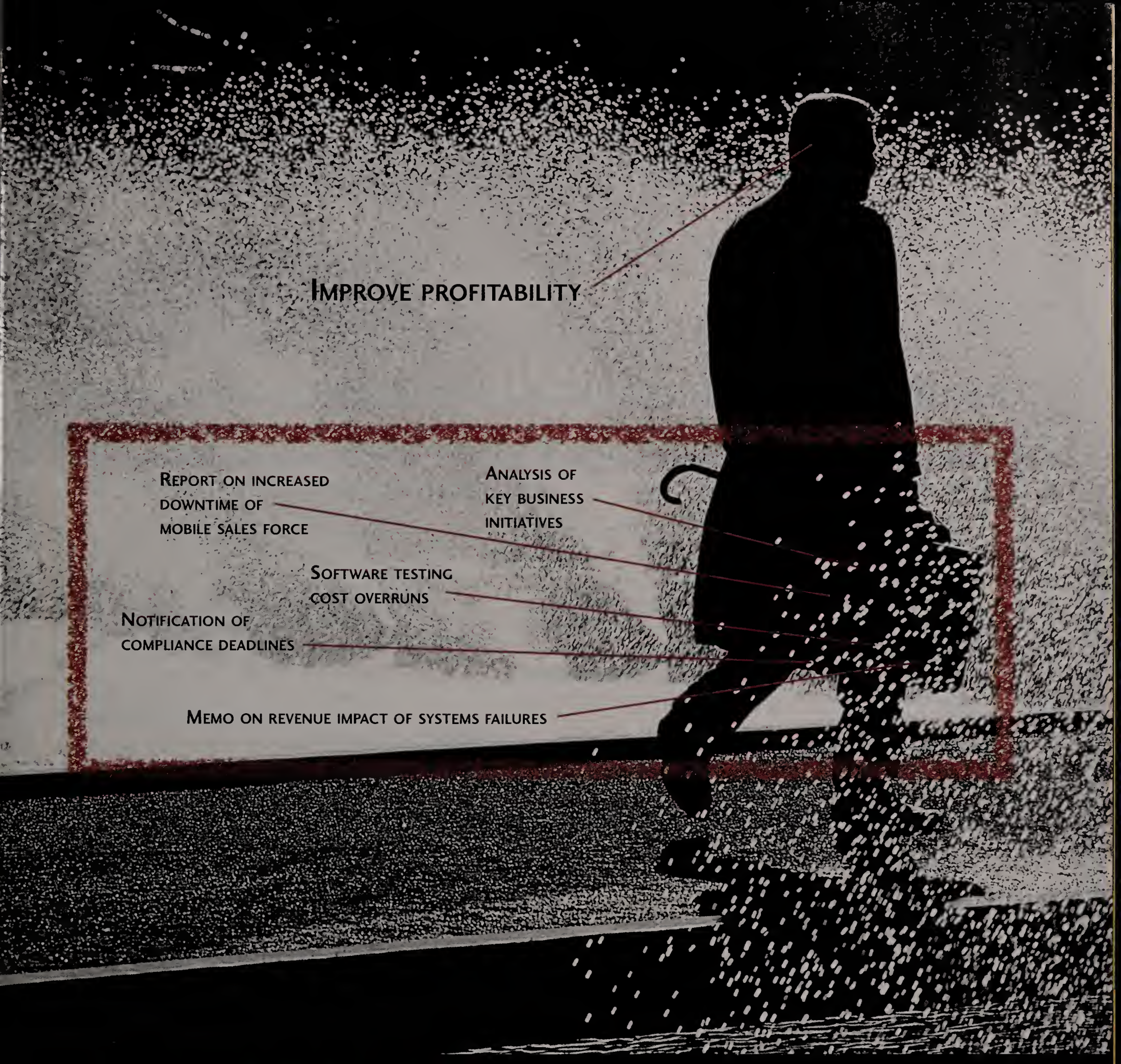
tion and delivery, the more users end up printing. One illustration of this effect is the recent success of color printers. We devoted a lot of lines to color in our 1992 article, and for all the sales that followed in '93 and '94 we might have well have saved the ink. It was not until the Web started routinely delivering graphics and color (such as Microsoft PowerPoint presentations) that color-printing sales accelerated. According to IDC (a sister company to CIO's publisher), the fraction of color printers shipped to U.S. businesses quadrupled between 1996 and 1999.

In just a few years enterprise printing has changed from a store-and-forward batch process—responsible for creating large numbers of relatively few, long documents to be stored, distributed to many people and then stored again—to one expected to produce large numbers of short documents, whenever needed, at or close to the point of consumption,

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Time to Videoconference

I RECENTLY HAD an important business meeting in New Jersey. Before Sept. 11, I would have flown the 250 miles. But my plans changed. I drove the four hours to the meeting and returned the same day. Are my actions out of the ordinary? Not according to Netscape.com. In the days following the terrorist attacks on Sept. 11, Netscape asked more than 5,000 people how they would travel to their next distant meeting. Fifty-three percent said they would fly; 47 percent opted to drive. None voted for videoconferencing.

The lack of interest in videoconferencing surprised me until I started to think about it.

Videoconferencing technology—and by that I mean really good videoconferencing technology—remains the exclusive domain of large businesses and the 9 percent of American households that can afford high-speed Internet access.

This shouldn't be the case.

For many years, the technology has allowed businesses and households to enjoy what the industry calls a rich experience, but the widespread deployment of videoconferencing technology has been curtailed by the political infighting between long-distance and local telephone companies. Long-distance telecoms, which make most of their profits from large businesses,



Gray J. Beach

want to expand their reach to consumers. Local telecoms are regulated monopolies reaping profits from households. Each wants, and needs, the other sector's customers to grow. And each has the wherewithal to offer those services tomorrow.

Six years ago I asked a local telephone company worker what type of cable he was laying in front of a friend's home. Of course, he was laying down fiber-optic cable capable of transmitting data and video images at very fast rates.

That cable remains buried in front of my friend's home. And the local telephone company continues to claim it cannot offer him high-speed services.

The events of Sept. 11 shook the world, the economy and hopefully both sectors of the telecom industry. In the near future, businesses that want to save costs by curtailing non-essential travel—and families that wish to remain in touch with relatives and friends but are afraid to fly—will combine to create a huge economic opportunity for players in the videoconferencing market.

Insiders in the telecommunications industry would be wise to find ways to make high-speed, low-cost access to our nation's telecom infrastructure as ubiquitous as air.

Or shareholders just might turn them into outsiders.

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Interview

BY DEREK SLATER

ELIZABETH Shuttleworth

Elizabeth Shuttleworth is executive vice president of operations and CIO at Radian Guaranty, a mortgage insurance provider in Philadelphia. Previously, she was CIO of pickle-maker Vlastic Foods International. Before that, she worked for SmithKline Beecham and Bell Atlantic, and earlier still at Computer Horizons in South Africa. CIO talked to Shuttleworth about changing industries. She's done that a lot and evidently has kept her sense of humor.

CIO: Industry knowledge is so important for today's CIOs. How do you ramp up your knowledge for a new gig?

Shuttleworth: You have to learn very quickly. Really it's reading, reading, reading. Each industry has its own rags; the ones in this industry are a little dull. There's one called *Secondary Market Executive* that I try not to read too much. [Secondary market executives] do very heavy-duty structured transactions. Here they've been very good; I've brought in a lot of new staff, and we've done lunch together so that people can share exper-

tise and plans. The businesspeople need to get to know our group and what we're going to do for them, and we need to understand what they're doing.

You [have to] ask a lot of questions too. I tell my staff, "Go into a project as if you know nothing about it." You get much better specifications or requirements if you ask questions instead of making assumptions.

Any key differences between your work at Radian and at Vlastic Foods?

At Vlastic, everything was supply chain optimization. That was the most crucial piece. Here you have a supply chain, but it's virtual. I also have [responsibility for] operations here. We do manufacture something in a sense—paper. A mortgage certificate, instead of a jar of pickles.

What motivated the switch?

The food business is very old and staid, and the opportunities to change how you do

business are few. What really interested me about this job was putting IT and operations together. I wanted to work for a company that "gets it." Here I don't feel like I'm dragging people along; instead they're pushing me to deliver as fast as possible.

So you don't find this kind of industry transition intimidating at all?

The things that keep you awake at night are very much the same. A mobile user is a mobile user, and the issues they face are the same whether you're at an insurance company or a food company. In every business, you put something in, move it around a bit and put it back out. That's what we do here; we take data in, move it around and put it back out again. When you boil it down like that, it's not so hard. **CIO**

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